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Improved Boring and Mortising Machine.

These engravings represent two views of a single machine intended for sawing and mortising fence rails, but which can be readily used for any work requiring similar manipulation, such as the framing of a house or other timbers. By the use of the machine the holes are mortised of a fixed length in the right places, sawed to a given length, and the rails pointed; picket tops can also be worked on slats or boards by this machine when so desired. This latter operation is performed by a separate detail attached to the back of the machine. This appliance is merely a bracket to support the rail and a guide set diagonally to carry the stuff to the saw at the proper angle. The saw bench is also provided with a gage (not shown) by which timber can be split to any given width. The peculiar feature of this machine is the means by which the length of the slot or mortise in the fence post is governed. By means of a lever, A, and the pins, B, the bench is moved forward a certain distance, when the lever, A, is acted on.

The boring mechanism seen protruding through one of the mortises then cuts away the timber fast. The pins govern the length and distance apart of the mortises, and the lever is brought close to the stationary pin, C, each time, so that it forms a stopping and starting point. The auger is worked up and down to enter or leave the timber, D, by the hand lever, E. Figure 2 shows the saw and the ingenious device by which, when the boring apparatus is at work, it is dropped out of the way. This device consists in placing the saw mandrel in bearings on an arm, F. This arm is fast at G, and swings on a pivot there, so that by taking hold of the bearing box the saw mandrel runs in, and, depressing it, the saw is carried down through the table out of the way. When wanted for use it is easily set up tight by the screw in the supporting arm, H, which bears against the slotted arm. The gage for governing the width of the stuff split is here shown at I.

Fig. 1.

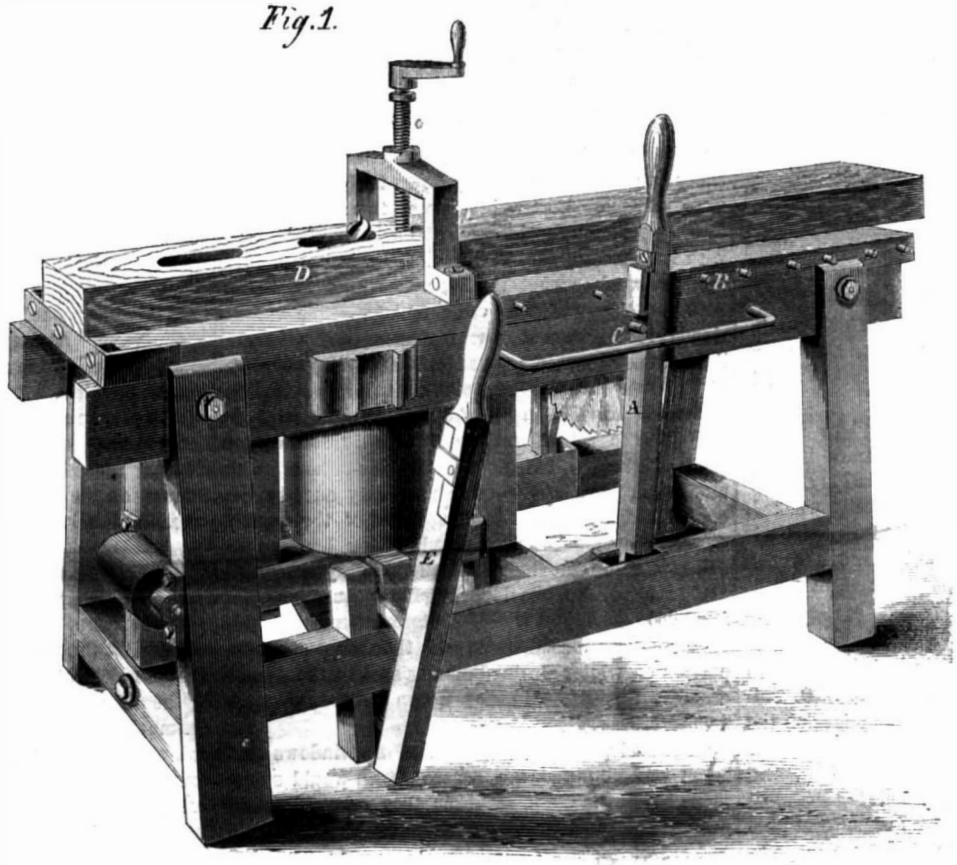
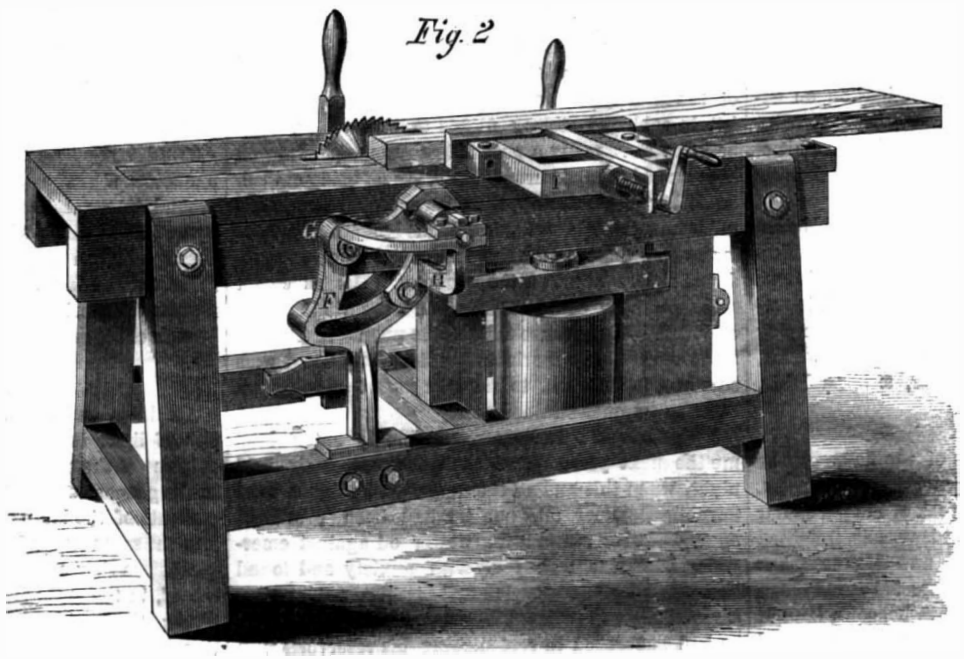


Fig. 2



KLAHR'S BORING AND MORTISING MACHINE.

These are the principal features of this machine, and combined with others spoken of previously, it is a very useful one. It was patented through the Scientific American Patent Agency, on Jan. 31, 1865, by Benjamin Klahr, of Bernville, Pa., whom address for further information.

Plaster of Paris.

Dr. Ure, in the supplement to his dictionary gives these facts in relation to gypsum, or plaster of Paris:—

"Gypsum is a sulphate of lime. When massive it is called indifferently alabaster or gypsum; and when in distinct and separate crystals, it is termed selenite. Massive alabaster occurs in Britain in the new red or keuper marl; in Glamorganshire, on the Bristol channel; in Leicestershire, at Syston; at Tutbury and near Burton-on-Trent, in Staffordshire; at Chellaston, in Derbyshire; near Droitwich it is associated in the marl with rock salt, in strata respectively 40 and 75 feet in thickness; and at Northwich and elsewhere the red marl is intersected with frequent veins of gypsum. At Tutbury it is quarried in the open air, and at Chellaston in caverns, where it is blasted by gunpowder; at both places it is burned in kilns and otherwise prepared for the market. It lies in irregular beds in the marl, that at Chellaston being about 30 feet thick. There is, however, reason to suppose that it was not originally deposited along with the marl as sulphate of lime, but rather that calcareous strata, by the access of sulphuric acid and water, have been converted into sulphate of lime—a circumstance quite consistent with the bulging of the beds of marl with which the gypsum is associated; the lime, as a sulphate, occupying more space than it did in its original state as a carbonate. At Tutbury and elsewhere, though it lies on a given general horizon, yet it can scarcely be said to be truly bedded, but ramifies among the beds and joints of the marl in numerous films, veins and layers of fibrous gypsum. A snow-white alabaster occurs at Volterra, in Tuscany, much used in works of art in Florence and Leghorn. In the Paris basin it occurs as a granular crystalline rock, in the lower tertiary rocks, known to geologists as the upper part of the middle eocene fresh-water strata. It is associated with beds of white and green marls; but in the Thuringewald there is a great mass of sulphate of lime in the Permian strata. It has been sunk through to a depth of 70 feet, and is believed to be metamorphosed magnesian limestone or Zechstein. In the United States this calcareous salt occurs in numerous lenticular masses in marly and sand strata, of that part of the upper silurian strata known as the Onondaga salt group. It is excavated for agricultural purposes.

"The gypsum of our own country is found, in apparently inexhaustible quantities, in the red marl form-

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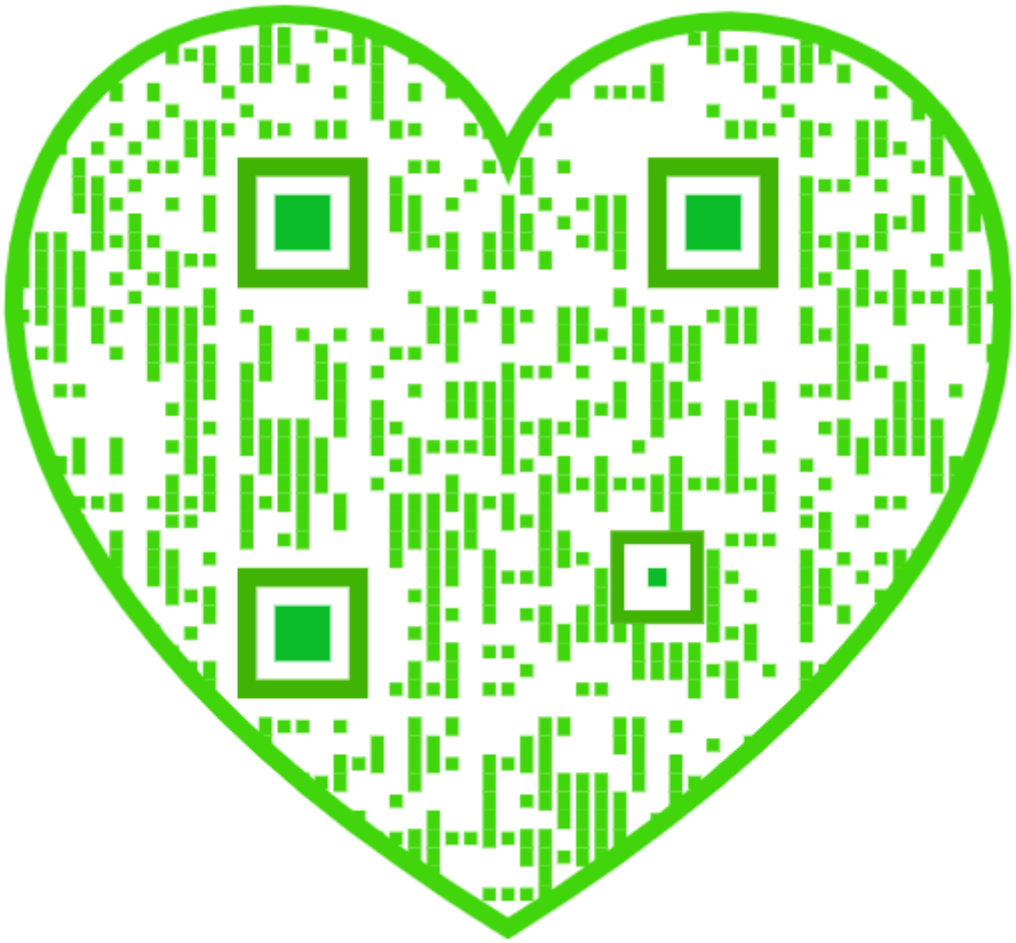

ation in the neighborhood of Derby, and has been worked for many centuries. The great bulk of it is used for making plaster of Paris, and as a manure; and it is the basis of many kinds of cements, patented —as Keene's, Martin's, and others.

"To get it for these purposes, it is worked by mining underground, and the stone is blasted by gunpowder; but this shakes it so much as to be unfit for working into ornaments, etc.; to procure blocks for which it is necessary to have an open quarry. By removing the superincumbent marl, and laying bare a large surface of the rock—the alabaster being very irregular in form—and jutting out in several parts, allows of its being sawed out in blocks of considerable size, and comparatively sound (as is illustrated by the large tazza in the Museum of Practical Geology). This stone, when protected from the action of water, is extremely durable, as may be seen in churches all over the country, where monumental effigies, many centuries old, are now as perfect as the day they were made, excepting, of course, willful injuries; but exposure to rain soon decomposes the stone, and it must be borne in mind that it is perfectly unsuited for garden vases or other out-door work in this country.

"In working, it can be sawed up into slabs with toothed saws, and for working moldings and sculptures, fine chisels, rasps and files are the implements used; the polishing is performed by rubbing it with pieces of sandstone, of various degrees of fineness, and water, until it is quite free from scratches, and then giving a gloss by means of polishing powder (oxide of tin) applied on a piece of cloth, and rubbed with a considerable degree of friction on the stone. This material gives employment in Derby to a good many hands in forming it into useful and ornamental articles, and is commonly called Derbyshire spar; most of the articles are turned in the lathe, and it works something like very hard wood.

"Another kind of gypsum also found in Derbyshire is the fibrous or silky kind; it occurs in thin beds, from one to six inches in depth, and is crystallized in long needle-like fibers; being easily worked, susceptible of a high polish, and quite lustrous, it is used for making necklaces, bracelets, brooches, and such like small articles."

CLYDONICS.

At the last meeting of the Polytechnic Association the following paper was read by Professor S. D. Tillman, the President, in conclusion of the paper on the same subject which was published on page 225 of our current volume:—

The celebrated historian, Buckle, believed the most effective way of turning observations of natural phenomena to account, would be to give more scope to the imagination and incorporate the spirit of poetry with the spirit of science. By this means our philosophers would double their resources, instead of working, as now, maimed and with only one half of their nature. They fear the imagination on account of the tendency to form hasty theories. But surely all our faculties are needed in the pursuit of truth, and we cannot be justified in discrediting any part of the human mind.

These views, if not applicable to methods of original research, are certainly of great moment in considering the best means of diffusing scientific knowledge; and if there is any branch of philosophy which is preeminently entitled to bring to its service the free play of fancy, it is that treating of the force of waves, whether propagated through liquids, aeriform fluids, or more attenuated media.

THE PHAROS.

A discourse on the structure of the flame of the ordinary lamp might not gain general attention, yet how intense the interest as we speak of the particular light which a captain seeks when his vessels, freighted with human beings, midst storm and darkness, has nearly reached its haven. There are scattered along our vast boundary five hundred such beacons, kept in operation at an annual expense to the United States' Government of more than a million of dollars.

A description of one of these is given in the posthumous papers of the gifted Thorean, just published under the title of "Cape Cod;" and although since the time of his visit a more imposing structure has arisen in the place of the old lighthouse, the account is so graphic, one feels, after its perusal, the satisfaction which he would probably have experienced by a personal inspection of the premises.

THE CAPE COD LIGHT.

"The Highland Lighthouse, where we were staying, is a substantial-looking building of brick, painted white and surmounted by an iron cap. Attached to it is the dwelling of the keeper, one story high, also of brick, and built by Government. As we were going to spend the night in a lighthouse we wished to make the most of so novel an experience, and therefore told our host that we would like to accompany him when he went to light up. At rather early candle-light he lighted a small Japan lamp, allowing it to smoke rather more than we like on ordinary occasions, and told us to follow him. He led the way first through his bedroom, which was placed nearest to the lighthouse, and then through a long, narrow, covered passage way, between whitewashed walls like a prison entry, into the lower part of the lighthouse, where many great butts of oil were arranged around; a winding and open iron stairway, with a steadily increasing scent of oil and lamp smoke, to a trap-door in an iron floor, and through this into the lantern. It was a neat building, with everything in apple-pie order, and no danger of anything rusting there for want of oil The light consisted of fifteen argand lamps, placed within smooth concave reflectors twenty-one inches in diameter, and arranged in two horizontal circles, one above the other, facing every way excepting directly down the Cape. These were surrounded, at a distance of two or three feet, by large plate-glass windows, which defied the storms, with iron sashes, on which rested the iron cap. All the iron work, except the floor, was painted white. And thus the lighthouse was completed. We walked slowly round in that narrow space as the keeper lighted each lamp in succession, conversing with him at the same moment that many a sailor on the deep witnessed the lighting of the Highland light. His duty was to fill and trim and light his lamps, and keep bright the reflectors. He filled them every morning, and trimmed them commonly once in the course of the night. He complained of the quality of the oil which was furnished. This house consumes about eight hundred gallons in a year, which cost not far from one dollar a gallon; but perhaps a few lives would be saved if better oil were provided. Another lighthouse-keeper said that the same proportion of winter-strained oil was sent to the southernmost lighthouse in the Union as to the most northern.

"Formerly, when this lighthouse had windows with small and thin panes, a severe storm would sometimes break the glass, and then they were obliged to put up a wooden shutter in haste to save their lights and reflectors; and sometimes in tempests, when the mariner stood most in need of their guidance, they had thus nearly converted the lighthouse into a dark lantern, which emitted only a few feeble rays, and those commonly on the land or lee side. He spoke of the anxiety and sense of responsibility which he felt in cold and stormy nights in the winter, when he knew that many a poor fellow was depending on him, and his lamps burned dimly, the oil being chilled. Sometimes he was obliged to warm the oil in a kettle in his house at midnight, and fill his lamps over again; for he could not have a fire in the lighthouse, it produced such a sweat on the windows. His successor told me that he could not keep too hot a fire in such a case. All this because the oil was poor. A Government lighting the mariners on its wintry coast with summer-strained oil, to save expense! That were surely a summer-strained mercy

"This keeper's successor, who kindly entertained me the next year, stated that, one extremely cold night, when this and all the neighboring lights were burning Summer oil, but he had been provident enough to reserve a little winter oil against emergencies, he was waked up with anxiety and found that his oil was congealed and his lights almost extinguished; and when, after many hours' exertion, he had succeeded in replenishing his reservoirs with winter oil at the wick end, and with difficulty had made them burn, he looked out and found that the other lights in the neighborhood which were usually visible to him, had gone out, and he heard afterward that the Pamet River and Billingsgate Lights also had been extinguished.

"Our host said that the frost, too, on the windows caused him much trouble, and in sultry summer nights the moths covered them and dimmed his lights; sometimes even small birds flew against the thick plate glass, and were found on the ground in the morning with their necks broken. In the spring of 1355 he found nineteen small yellow birds, perhaps goldfinches or myrtle birds, thus lying dead around the lighthouse; and sometimes in the fall he had seen where a golden plover had struck the glass in the night, and left the down and the fatty part of its breast on it.

"Thus he struggled by every method to keep his light shining before men. Surely the lighthouse keeper has a responsible, if an easy, office. When his lamp goes out, *he* goes out; or, at most, only one such accident is pardoned.

"I thought it a pity that some poor student did not live there, to profit by all that light, since he would not rob the mariner. 'Well,' he said, 'I do sometimes come up here and read the newspaper when they are noisy down below.' Think of fifteen Argand lamps to read the newspaper by! Government oil! light enough, perchance, to read the Constitution by! I thought that he should read nothing less than his Bible by that light. I had a classmate who fitted for college by the lamps of a lighthouse, which was more light, we think, than the University afforded."

WAVE-MOTIONS.

Let us in imagination stand with Thoreau on the luminous tower and amid the agitations of ocean, air and æth, consider the laws by which The Presiding Power controls these elements. The restless sea through all its movements, from ripple to billow, obeys the same mandate; the time of each oscillation is proportional to the square root of the length of the wave. At great depths the motion of the fluid is wholly insignificant, because at a distance below, equal to the length of a wave, the motion is only $\frac{1}{535}$ of that at the surface.

The size of the wave depends, therefore, upon the force of the wind and the depth of the sea. The largest on the Atlantic observed by Capt. Scoresby were 550 feet long and 30 feet high.

AIR-WAVES.

The air, however, is not confined like the sea, which has only an upward and downward motion, except near the shore, where the force it contains would escape. But the whole mass of air, moving as wind, has also a vibratory or wave-motion producing sound. If the distant bell we hear is tuned to middle C of the musical scale, according to the new French standard, and the temperature is at 16° centigrade, its sound is produced by air-waves vibrating—not undulating—at the rate of 522 per second, each of which is about 2·15 feet in length. The lowest octave of this note which could be heard would, according to Savart, be the result of 16·31 waves per second, each about 68·8 feet long, and the highest octave by waves moving at the rate of 33,408 per second, each ·0492 of a foot in length.

ÆTH-WAVES.

Turning now to the light produced by the fifteen Argand lamps, we behold still more wonderful wave phenomena. The all-pervading æth is, for miles around, thrown into undulations moving at an average rate of 582 million of million per second, having an average length slightly exceeding twenty-one millionths of an inch. These numbers, determined by repeated experiment, appall us, and we turn to that branch of the subject where results are more palpable.

THE CHEMISTRY OF FLAME.

All the phenomena attending the artificial production of light is not yet fully understood. Light is only one of the effects of the burning of hydro-carbons in the gaseous state. The solid candle and the liquid contents of the lamp must be volatilized, and brought into the same expanded state as ordinary illuminating gas before they can be burned. This conditon is attained, in the case of the candle, by the heat of the flame; the liquid wax or tallow, by capillary attraction, is carried along the wick to the point where it is turned to gas. Yet light does not emanate from gases. Draper found that while gases heated to over 1100° centigrade do not give light, all the solids subjected began to be luminous at about 510° C, and they display the several colors of the prism, and finally emit white light.

In the process of burning illuminating gas, the

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hydrogen is first combined with the oxygen of the air, and the solid particles of carbon, thus deserted by the hydrogen and exposed to the heat generated by the burning gasses, become incandescent, and afterwards unite with oxygen forming carbonic acid gas.

It is, however, true that when the carbon is consumed at the same time with the hydrogen, no light is evolved; such condition exists when the oxygen is mechanically, but thoroughly mixed with the hydro-carbon gas before it arrives at the place of burning. This is effected by the Bunsen burner, in which the air is admitted at the bottom and mixed with the gas on its upward passage within the burner.

The result of this simultaneous burning of both carbon and hydrogen is an increased amount of heat and an almost entire absence of light. It seems, therefore, to be essential to the production of light, that the combustion of the carbon should take place after that of the hydrogen.

INCANDESCENCE.

Steel filings dropped into a current of heated gases give forth brilliant scintillations. Hare, soon after his invention of the hydro-oxygen blow-pipe, found that a pencil of lime held before it, in the burning gases, emitted a light of intense brilliancy. Such a light, when its rays were thrown into parallel lines by means a parabolic mirror, has been seen in diffused daylight at a distance of more than one hundred miles. But to assert that light is generated because carbon or any other solid is incandescent, is not to explain the phenomenon.

Light is proved, beyond a doubt, to be the result of waves moving transversely to the line of propagation; the solid from which it proceeds must, therefore, have the power of producing such waves in the æth. The interesting question to be settled is whether the solid itself, or the æth within it, can be set into high vibratory action by means of waves of heat having a lower rate of velocity. Reasoning from analogy, we must decide in the affirmative.

WAVE INDUCTION.

Air waves have the power of exciting vibrations in solids which are more rapid than the waves producing them. This fact was brought forcibly to my notice many years ago, when I found the low tone in which I was conversing in a certain room was constantly followed, not by an echo, but by a musical note of very high pitch; after a search, the sound was found to proceed from a sheet of steel, 6 or 8 feet long by as many inches wide, standing on its end and resting against the wall.

This sympathetic action can be accounted for by the laws of harmonics. The proper tone of a bell is always accompanied by harmonic sounds readily perceptible to a fine ear. It is asserted by some musicians that every sound made by a musical instrument is thus accompanied.

The vibratory action arising from periodic pulses sometimes appears to be greater than the cause; this arises from the fact that a new impulse is given just before the force of the previous impulse is expended. The same remark may be applied to oscillations. In the gymnasium, the self-swingers exert themselves only at the extremities of the arc. The danger of regular pulses where weight is sustained is well known. Soldiers in crossing a wooden bridge are required to break ranks and step out of tune. I have often seen the long span of a timber bridge, which was firm under the tread of a herd of cattle, thrown into quick vibration by the rapid passage of a dog across it.

The condition required in this case is, that the tread of the dog shall harmonize in time with the vibratory action due to the elasticity of the timber. Many points connected with the subject of secondary vibrations are yet to be further elucidated by experiment.

LIGHT FROM RAPID DILATIONS.

Only one other cause for æth-undulations by means of carbon can now be suggested; it arises from the characteristics and conditions of the three important simple bodies which play the principal parts during ordinary combustion. Oxygen, the element of which more than one-half of our globe is composed, when isolated, is a permanent gas. No power yet applied has reduced it to the liquid state. Hydrogen, a gas sixteen times lighter than oxygen, has also no cohesive power. Natterrer, of Vienna, subjected these gases separately to a pressure of 3,000 pounds to the square inch, when at a temperature of 106° centigrade below the freezing point of water, without producing cohesion. Yet these two gases, when mixed in the proportion of two volumes of hydrogen to one of oxygen, are, by the electric spark, instantly condensed to steam, and, on cooling, to water. Carbon, on the other hand, when isolated, is always a solid. No amount of heat yet applied has brought it to a gaseous, or even a liquid state. In its most condensed condition—as the diamond—it had 3·55 times the specific weight of water; it is 41,390 times heavier than an equal bulk of hydrogen, 2,618 times heavier than oxygen, and 2,992 times heavier than olifiant gas (C_4H_4).

In the process of illumination by the combustion of hydro-carbon gases, as described, the isolation of the carbon seems to be essential. It must, therefore, instantly change its volume and become a solid, and then as quickly assume the gaseous state, in the formation of carbonic acid gas. These rapid contractions and expansions of carbon may act as pulsations on the pervading æth, and thus generate the whole series of waves, which, commingling, form white light.

It is passing strange that carbonic acid gas, a resultant in generating light and heat—including the vital heat of myriads of animals—should, after its passage from the lamp or the lung to the leaf, be again separated from oxygen by a force similar to that its constituents can generate under certain conditions.

MOLECULAR FORCES.

Turning again to the Highland Lighthouse, let us estimate the power expended on its lamps. The average weight of oil consumed nightly was about 16 pounds at the time of Thoreau's visit. Taking the mean of the results of experiments by Favre, Silbermann, Dulons, and Andrews with olifiant gas (oil-gas not being given), we find that 11,943 pounds of water are raised 1°C by the combustion of one pound of oil. This sum multiplied by 16, the number of pounds used per night, and that product by 1,390, the number of foot-pounds which measures the force expended in raising one pound of water 1°C—that being the mechanical equivalent of heat as correctly determined by Mayer in 1842—we have 265,612,320 foot-pounds as the amount of energy expended in generating the light required for a single night.

In order to fully appreciate the power of these molecular forces, it is only necessary to refer to Dr. Tindall's admirable work on "Heat as a Mode of Motion." After calculating the mechanical value of the energy developed when the atoms of one pound of hydrogen and eight pounds of oxygen attract each other, fall and clash together, when the molecules of steam thus generated condense to water, and this water is converted to ice, the author says:—

"Thus our nine pounds of water, in its origin and progress, falls down three precipices; the first fall is equivalent to the descent of a tun weight, urged by gravity down a precipice 22,320 feet high; the second fall is equal to that of a tun down a precipice 2,900 feet high; and the third is equal to a descent of a tun down a precipice 433 feet high.

"I have seen the wild avalanches of the Alps which smoke and thunder down the declivities with a vehemence almost sufficient to stun the observer. I have also seen snow-flakes descending so softly as not to hurt the fragile spangles of which they were composed; yet to produce from aqueous vapor a quantity of that tender material which a child could carry, demands an exertion of energy competent to gather up the shattered blocks of the largest avalanche I have ever seen, and pitch them to twice the hight from which they fell."

Such is the impressive estimate of the force expended in the formation of a pound of ice from its component elements in the gaseous state, yet it will be observed, by the figures already presented, that the energy developed in one nocturnal display of the Highland beacon was sufficient to have thrown the fragments of five such avalanches to the same hight.

Thoreau, the student and lover of Nature in her wild moods and original garb, doubtless, with mingled feelings of awe and delight, beheld from that beacon-tower the surging of the sea, and heard, in sullen sounds, the threatenings of a tremendous force; but as he turned toward the light, which fixed the gaze of many an anxious mariner, he did not realize the truth that Art had there trained Nature to perform the common service which must ever be regarded as one of her greatest miracles; and that, to guide the sailor along the dangerous coast, she sent forth her messengers of light amid the ambient æth, whose undulations, in each and every minute of time, outnumber all the ocean waves that have culminated since man first ventured on the deep.

The National Debt.

The entire debt of the United States is officially reported, under date of May 31st, at a little over twenty-six hundred and thirty-five millions of dollars, which is near five hundred millions more than was estimated in the last report of the Treasury Department. The exact figures are as follows:—

Interest payable in gold	$1,108,113,842
Interest payable in currency	1,053,476,371
Treasury Notes not bearing int.	472,829,270
Past due, and interest ceased	786,270
Total	$2,635,205,753

The estimated receipts for the year ending June 30, 1866, are three hundred and ninety-six millions, as follows:—

From Customs	$70,000,000
From Internal Duties	300,000,000
From Lands	1,000,000
From Miscellaneous Sources	25,000,000
Total	$396.000,000

The annual interest in coin and currency together is over one hundred and twenty-four millions, which is an inconsiderable fraction less than six per cent on the interest-paying portion. We are now able for the first time to assign a proximate limit to the debt, and to estimate very closely its yearly burden on the country. When all the expenses of the war are settled the mass will doubtless be near three thousand millions of dollars. The policy of the Government will be to convert the Treasury Notes into bonds with as little delay as possible. At six per cent, which is the present average rate, our annual interest will be one hundred and eighty millions of dollars.—*Evening Post.*

MISCELLANEOUS SUMMARY.

At the Academy of Sciences, M. Collignon read a paper on a method of representing the surface of the earth on a plane, by making the poles the common centre of a series of circles representing the geographical parallels. By this system of projection, the deformation of the angles and changes of length may be easily ascertained, and thus, by easy rules and tables, constructed by the author, the real dimensions may be easily determined at each point of the map. Mr. Reboul sent in a paper on a new carburet of hydrogen, which he calls *valylene*, and which is composed of ten equivalents of carbon and six of hydrogen. It is obtained by distillation from the bromide of valerylene, treated with an alcoholic solution of potash. The new substance only distils from the latter at a temperature of from 40° to 50° centigrade.—*Galignani.*

Test for Rum.—Mix a little of the rum to be tested with about a third of its bulk of sulphuric acid, and allow the mixture to stand. If the rum is genuine, its peculiar odor remains after the liquid has cooled, and even after twenty-four hours' contact, may still be distinguished. If, on the contrary, the rum is not genuine, contact with sulphuric acid promptly and entirely deprives it of all its aroma. The author affirms that he had never found this very simple process fail, and that all spurious rums may thus easily be distinguished from the genuine.—*Pharmacie & Chem. News.*

Adulterated Lard.—Dr. Crace Calvert, of Manchester, England, says that the snowy appearance of American lard is obtained by thoroughly mixing, by means of machinery, starch in a state of jelly and a little alum and lime, with the lard, by which means two ends are attained, viz., the introduction of twenty-five per cent of useless matter, and a perfect whiteness from the high state of division of the same.

A huge raft of logs, estimated to contain 700,000 feet of lumber and measuring half a mile in circumference, was towed up Lake Memphremagog the other day. It belonged to a company in Newport whose steam mill sawed 13,000 feet of lumber in nine hours and forty minutes.

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FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute on Tuesday afternoon, June 6th, the President, N. C. Ely, Esq., in the chair.

PROFITS OF STRAWBERRY CULTURE.

Mr. Bergen stated that the statistics of the strawberry culture in Burlington County, N. J., and two or three of the adjoining counties, had been collected, and it was found that the average yield per acre was 58 bushels, and the average price was $6 per bushel. The average yield of blackberries is 48 bushels to the acre, and the average price $4 per bushel. The yield of strawberries seemed to the speaker very small, as we have had accounts of 300 or 400, and even of 700 bushels to the acre. But he supposed the statistics embraced all the fields, good and poor.

He remarked further that experience had taught him that it is unwise to attempt to gather more than one crop of strawberries from the same plants. Set the plants in the spring and take good care of them through the season; then gather the crop the next year, and turn the vines under.

Mr. Carpenter confirmed this opinion, except where strawberries are cultivated in hills; then they should be richly manured every fall, the manure spaded in the spring, and the ground should be mulched. In regard to the profits of strawberry culture, a friend of Mr. Carpenter's, in Burlington county, was having 1,500 quarts per day picked for the Philadelphia market, and they sell for 40 cents per quart. A neighbor of his is gathering 2,500 quarts per day, thus receiving more than $1,000 daily for strawberries. In both these cases the variety cultivated is the French seedling, a large, early and productive kind.

SEEDLING ROSES.

Mr. William A. Burgess, of Glen Cove, presented a bushel-basket full of different varieties of seedling roses, which were produced by himself from the seed. He remarked that the idea had prevailed that seedling roses could be produced only in France, but the truth was, that they could be propagated from the seed here better than in France. He advised everybody to plant their rose seed. He had obtained blossoms in nine weeks from the time the seed sprouted.

THE WAY TO GET RID OF ROSEBUGS.

Mr. Solon Robinson observed that he was very much troubled with rosebugs this year, his grapes being threatened with total destruction by them. He had, however a plant of spirea—the Spirea Lindlianna—which is so attractive to the rosebugs that they all collect upon it, and it is then very easy to pull them off and roast them—the only mode of destroying them that he had found effectual.

Gum Copal.

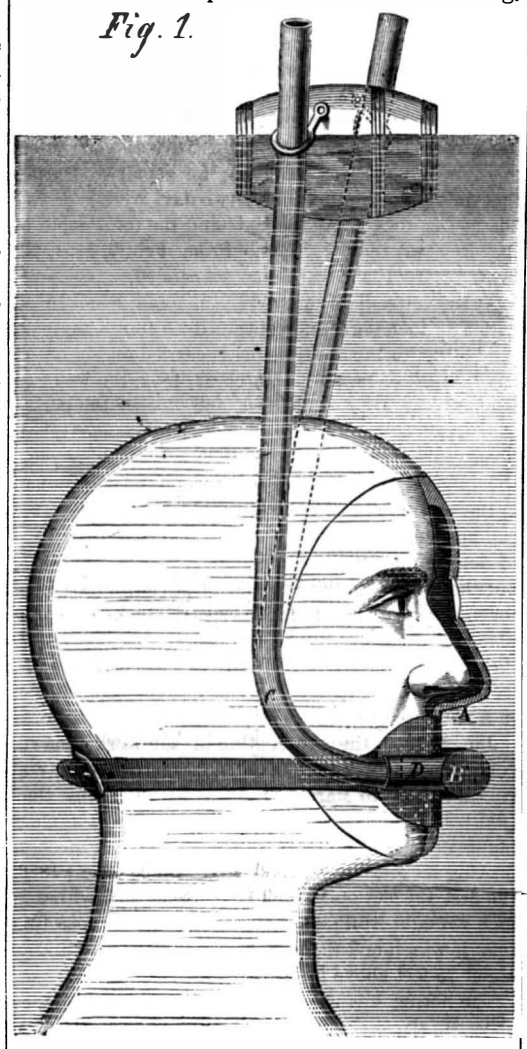
The purest and best gum copal in the world is found on the mainland of Africa, near Zanzibar. It is, without doubt, a fossil gum. It is dug from the earth by negroes, and by them carried to the Banian traders, in small quantities, for sale. When it reaches Zanzibar, it is in a very dirty state, and requires much sifting and garbling before it is merchantable; it is then cleansed with solution of soda-ash and lime, put up carefully in boxes, when it is ready for the home market. That it is a gum may be proved from the fact of its rough or "goose-skin" surface, which no doubt is an impression of the sand or earth when it ran down from the tree in a soft state. Pieces, too, are found with sticks, leaves, and insects preserved in them in the most perfect state. Large and uncouth-looking pieces will often have many impurities, such as dirt, sand, and hundreds of little black ants in them, giving the copal a dirty, dingy appearance. At the diggings no copal trees are found, or even any signs of them; and to this time it is mere conjecture in what ages these deposits of copal were made, probably many thousands of years ago. I have tried to get specimens of anything the negroes might dig up with the copal; but they, in every case, say that they get nothing whatever. There are copal trees on the coast and on the island; but the gum from them is not a merchantable article at all, and when mixed with the fossil gum, is always rejected. Without doubt the quality of that dug is made as pure as it is, by the chemical action of the peculiar kind of earth in which it is buried. Some copal is found on this island, but it is so poor that it is not much sought.—*Pacific Monthly.*

HAWKINS'S DIVING MASK.

This invention is intended to assert the respiration of divers, or persons exposed to noxious gases, foul vapors, smoke, etc.

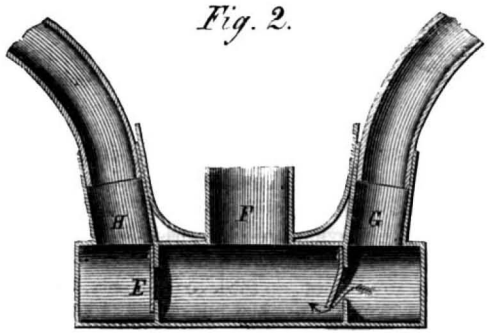
By the use of it fresh air can always be led to any point where the atmosphere *is* vitiated. Thus, in diving—going to a depth below the surface of the sea—great difficulty is experienced in breathing, as is commonly known, and fresh air has to be pumped or forced down to persons who follow such calling.

Fig. 1.



The engravings published herewith represent a contrivance for regulating the admission of pure and the exit of foul air to and from the lungs. To this end the mask is fitted with a T-shaped tube, B, which has pipes, C, issuing from its branches, D. In the T there is a compartment, as in Fig. 2, in which the valves, E, fit. The mouth-piece is at F, and it will be seen that as the cold air is forced down or falls by its gravity in the pipe, C, the heated air expelled from the lungs rises naturally through the

Fig. 2.



valve, H, thus rendering exhalation and inhalation comparatively free, and separating pure from foul air. This device would be useful in foul wells where carbonic acid gas collects in cess pools, or in similar places.

Patented through the Scientific American Patent Agency March 21, 1865, by James Hawkins, of Braddock's Field, Pa.; for further information address him at that place.

CORNISH PUMPING ENGINES.—The number of pumping engines reported for March is 36. They have consumed 3,048 tuns of coal, and lifted 23·2 million tuns of water 10 fms. high. The average duty of the whole is, therefore, 51,400,000 lbs. lifted 1 ft. high by the consumption of 112 lbs. of coal.

RECENT ENGLISH PATENTS.

GELLERAT'S STEAM ROLLING AND PORTABLE ENGINES.

This invention, patented as a communication to Mr. Henry, the patent agent, Fleet street, consists of an apparatus, mounted on axles which carry rollers, acting both as propelling and bearing wheels or rollers, and which can be caused to converge or move out of the parallel, in order to turn the engine to either side. Motion is communicated to them by a train of toothed wheels driving a chain-wheel, mounted on the axle-box, and transmitting rotary motion to the bearing-wheels or rollers by a crank arm or short connecting rod jointed to a radial arm of such wheel or roller. The axles are not fixtures, but are suspended in brackets, fitted with friction-rollers, and they are moved by a double-threaded worm, or right and left handed screw, which takes into nuts, and is worked by handle and bevel gear.

CLAVEL'S LAMP-GLASS HOLDERS.

The specification of this patent, recently filed by Mr. Henry, patent agent, Fleet street, consists in constructing the sockets, holders, or supports for gas and lamp glasses, or chimneys, adjustible as to size, or extensible and contractible, so that one holder will serve for various sizes of glass or chimney. This is effected by forming the socket or holder with slots, and tightening or loosening it, so as to vary its diameter, either by a conical outer ring, or by an incomplete ring or cylinder, with a break or opening in it, fitted with a screw; or the holder itself may be of the form of an incomplete ring or interrupted cylinder, opened and closed, or tightened or loosened, by a screw. The improvement may be applied to the rings or lower parts of frames or supports fitted round chimneys or glasses of lamps or burners to receive shades or reflectors.

RAILWAY TRANSIT.

Mr. John Routledge, carriage-department manager of the West Hartlepool Railway, has recently effected an improvement in railway passenger traffic, in rounding extreme curves in the line, that cannot fail to prove highly useful and beneficial to the traveling public. Some of the immediate results of the improvement will be to insure perfect safety, with long carriages, at a high rate of speed, and prevent what is known as the crease of the tire and side of the rail. There are three pairs of wheels, the center ones performing the radiating process, and the end ones connected with the center by rods, are made to the requirements of the case, no matter how great the curve may be. The invention was tested a short time since by Mr. W. S. Leng, the West Hartlepool Harbor and Railway manager, on the curve near Hartlepool station, and found to be a complete success.—*Stockton and Hartlepool Mercury.*

[This is the same thing as the Bissel truck which has been in use for years in this country.—EDS.

How to Combine Fat and Oil with Aniline Red.

Dr. E. Jacobsen gives the following process :—He first separates rosaniline from commercial fuchsine by heating with soda or digestion with ammonia, washes and dries it. He than adds the rosaniline to oleic acid or melted stearic acid as long as it will dissolve, or puts them together in equivalent proportions. An excess of oleic acid must be avoided when the compound is required for a varnish, as it delays the drying. Oleate or stearate of rosaniline easily dessolves in fats or oils, and colors these an intense red. If it is wanted for a linseed oil varnish, the linseed oil must be free from lead. The compound must be kept from the fire, or it soon burns blue, probably by the reducing action of the fatty acids. The best red color is obtained in linseed oil varnish. Stearin with oleate or stearate of rosaniline appears a bluish red. Paraffine appears to act as a reducing agent with the compounds of fatty acids and aniline, and changes to a dirty violet color; the mixture then is inapplicable to the coloring of paraffine or stearin candles. The oleate or stearate of rosaniline is a good coloring agent for hair oil or pomatum, but from the instability of the color seems inapplicable for oil painting or varnishes.—*Dingler's Polytech. Journal.*

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GREAT CRUCIBLE-CLAY DEPOSIT IN MISSOURI.

Glass has been defined as the silicate of potash, but this definition is not sufficiently comprehensive. Glass is generally a double silicate, a combination of silica with two or more of the metallic oxides, potash, soda, lime and red lead. The silica is usually obtained in the form of sand, which has been produced by the slow grinding of quartz rock, by the action of waves, or other natural agencies. This is thoroughly mixed with the metallic oxides and the mixture is placed in a clay crucible, where it is subjected to a heat so intense as to be fused, when the several substances enter into chemical combination, and become glass. The pots are set in circular furnaces, and are so formed as to exclude the flames from contact with their interiors, openings being provided through the walls of the furnace for introducing the materials and removing the glass when it is melted. The crucibles are in the form of a cocoanut dipper, elongated and inverted, closed at the bottom, but having an opening near the top provided with a neck to enter the hole in the furnace wall. They vary in size, but are usually about four feet in diameter and four and a half feet high. They stand in a circle around the interior of the furnace, and are entirely surrounded except the bottom and narrow opening, with flames of the most intense heat, the heat to melt the glass passing through the thick walls of the crucible; though for some kinds of glass the crucibles are made open.

When a pot cracks it is very apt to cause the cracking of others, and the placing of a new pot in lieu of a broken one, is one of the most difficult and trying operations known in any of the arts. The wall of the intensely-hot furnace is broken open to admit the removal of the old pot, the new crucible is taken at a red or white heat from the annealing furnace, and trundled on an iron carriage to its place, where it is nicely adjusted in position, and the wall is then rebuilt around it with brick and mortar, which are manipulated by means of long-handled shovels and trowels.

The evils resulting from the cracking of a pot being so great, every precaution is adopted to make the disaster as rare as possible. The clay is kneaded and re-kneaded, the labor of a whole week being expended upon the formation of a single pot; after the crucible is formed it is set in a warm room to dry for several months, some manufacturers continuing the drying for more than two years; before being set in the furnace it is placed in an annealing chamber, where, by a gradual increase of temperature continuing for several days, it is slowly raised to a white heat, and it must be set in the furnace while in this condition.

With this great importance of the quality of a crucible, of course the utmost attention is given to the material of which it is formed. The properties required in the material are perfect infusibility and the greatest possible exemption from liability to crack. The desired infusibility is found in pure clay —the silicate of alumina—but this is decomposed at a high temperature by lime, the silica leaving the alumina and entering into combination with the lime to form a silicate of lime, which is easily melted. Clays, therefore, which contain lime, are worthless for making glass pots. But the most troublesome substance is sulphide of iron; where this is present, sulphuric acid is formed, and this dissolves the alumina. So serious is the difficulty from this source, that some English establishments have the clay rolled out in thin sheets upon tables, and men are employed to pick out, by the aid of magnifying glasses, every minute speck of iron pyrites.

Heretofore the clay for crucibles has been imported by all our glass works either from Germany or from Stourbridge, in England; it is worth $25 per tun in gold in this market, and a single manufactory will consume 300 tuns a year. But a large deposit has been found near St. Louis, in Missouri, which from analysis and practical trial is pronounced fully equal to the best English or German clay. This is another important step in the development of the mineral resources of the country.

The owners of this clay bed are J. L. Smith & Co., of St. Louis, and the agent for the Eastern States is H. T. Malcolmson, of No. 40 Murray street, New York.

The Artesian Well in St. Louis.

Most of the residents of St. Louis know where the artesian well is situated—on O'Fallon, above Lewis street—and have drank of its waters. This well was commenced in the spring of 1849, by Messrs. Belcher & Brothers, for the purpose of procuring water for the use of the refinery. At first, the bore was but nine inches in diameter, and the process of boring was carried on by hand for eighteen months; but as the rock became hard to penetrate, at the end of that time only two hundred and nineteen feet of rock had been bored through, and the total depth of the well was but two hundred and forty-nine feet.

In September, 1850, steam power was first employed, and used to the termination of the work, and the boring was continued until Feb. 7, 1851, with such intermission only as was requisite for repairs. During this time (five months) forty-two days were lost, and 208 feet of rock were pierced, and the total depth of the well was then 457 feet. From Feb. 7, 1851, till Sept. 29, 1851, the work was suspended.

At the latter date the work was again commenced with a 3½-inch bore, and continned till March 22, 1852, the boring during the time being carried on night and day from Nov. 18, 1851. March 22, 1852, the well had reached a depth of 1,351 feet, and, during the period of nearly six months, 894 feet had been penetrated. From March 25, 1852, to April 30, of the same year, was taken up in widening the bore of the first 80 feet of the well from 9 to 16 inches in diameter, which, accomplished, a large pump was inserted, with a view of determining the quantity of water then furnished; but the results of the experiment proved unsatisfactory. From Sept. 1, 1852, several weeks were employed in widening the 3½-inch bore of the well to 5½ inches, from the depth of 457 feet to that of 1,050 feet, which had proved a source of great trouble, and in a measure prevented the prosecution of the work.

Jan. 6, 1853, the prosecution of the work was recommenced with a bore of 3½ inches in diameter, and continued up to March 11, 1855. During this time (fourteen months), though 120 days were lost in making necessary repairs, it had sunk 848 feet deeper, making its total depth 2,197 feet. Since Aug., 1856, the first 456 feet of the well have been tubed with a 3-inch wrought-iron pipe, and, at the time of inserting this, it was found that water would rise to a hight of about 75 feet above the surface.

The boring was effected by a simple wedge shaped drill, the size of which varied according to the diameter of the bore. This drill was screwed to a wrought-iron bar, 30 feet long, and about 2½ inches in diameter, the total weight of which was about 600 pounds. To the bar was screwed a pair of slips, by which arrangement the drilling was effected by the weight of the bar alone. To this was fastened the poles, each 30 feet long (with male and female screws), made of two pieces of split hickory, joined and riveted in the center. To the last pole was fastened one end of a chain, the other end of which was attached to a spring beam worked by a steam-engine running with a speed of about eighty revolutions in a minute, and a stroke of fourteen inches. The boring apparatus was constantly turned by hand-power, and, for performing all the work connected with the boring, the labor of four men was, in general, daily required.

This well was finished at the expiration of thirty-three months' steady work, and cost $10,000. The depth of the Artesian well at Grenelle, France, is 1,797 feet. It was eight years in completion and cost $30,000. The Louisville Artesian well is deeper than the St. Louis. What it cost, we are unable to state.

The water comes up through a twenty-inch cast-iron pipe, bolted thirty feet below the surface to the solid rock, and by means of a connecting pipe, is conducted outside of Belcher's sugar refinery, where the largest quantity of it passes into the sewer. A small pipe discharges into a box, and any one can drink of it, or carry any quantity away in bottles or jugs. Neither its quantity or quality has changed since it commenced to flow, and it discharges, according to measurement, 300 quarts per minute. It has a salty taste, and a strong odor of sulphur. In fact, so strong is the sulphur, that the white paint on the building near it has been turned blue. It is highly praised for its remedial virtues, and is visited daily by hunddreds to drink of its water. The workmen in the refinery say that it is much pleasanter than ice water, and they feel better after drinking it.—*Dispatch.*

Clark on Steam Boilers.

Mr. D. K. Clark, author of the ablest and most practical work on the locomotive engine ever written, gives his views on the subject of the wear and tear of steam boilers in a letter to the *Engineer*. What Mr. Clark says about electricity and galvanism in connection with this subject, will be appreciated by every sensible person. We have generally found that when any one desires to make a display of knowlege about a matter he is ignorant of, he explains the mystery by something else he is equally uninformed upon. Mr. Clark's opinions are not liable to this imputation, for he knows whereof he affirms, and accounts for the frequency of disasters to boilers on mechanical grounds.

"Probably the most important practical inference to be drawn from the tests of the strength of riveted joints, is the explanation they supply of the failure, hitherto unexplained, of boiler plates, not at the joints, but in their neighborhood. We are aware that electrical and galvanic action are freely adduced in explanation. But these words have two meanings; they mean electricity and galvanism, and they mean ignorance and mystery. It is known that boilers fail by corrosive and other agencies eating into the plates on the inside, pitting and furrowing the surface. The pitting of the metal is readily explained by the presence of chemical agents in solution in the water, and the known inequallty of substance of iron plates and bars, in consequence of which the metal is gradually but unequally separated and dissolved, and probably a weak galvanic circuit may be established between the iron shell and the brass tubes, accelerating the process of dissolution. But this explanation does not meet the frequent case of a straight, continuous furrow, cut like a groove upon the surface. Furrows are observed to be found parallel to, and close to, the riveted joints. Not in any case, that we are aware of, have they been found at any notable distance from a riveted joint, nor otherwise than parallel to one. The inference is inevitable that there is a relationship between them, and our conviction is, that the alternate tension and relaxation of the plates at the joints, as the steam is got up and let down, are attended by an alternate distortion—incipient, it may be—and resumption of the normal form, a bending and unbending of the plates on each side of the joint, in consequence of which the texture of the metal is gradually loosened in lines near to and parallel to joints, and it is thus laid open to corrosive action. On this interpretation the commencement of a groove or furrow, establishing a weak place and concentrating the action there, would suffice to extend and deepen it to the dangerous limits occasionally announced by explosions.

"The weakness attendant on lap-joints is strikingly exemplified in the lap-welded joint, when subjected to extreme tension; the tensile strength, though the metal at the weld is perfectly solid and fully as strong in itself as the body of the plate, is much below that due to the regular section of the plate. Here there is no elementary weakness in the reduction of metal by rivet-holes; the inferiority of strength arises solely from the bending of the plates on both sides of the lap, and the overstraining of the fire-box, in the endeavor to attain to the position of stability.

"The furrowing of lap-jointed plates reads an important lesson on the real and ultimately practical value of direct connection, and direct action in exerting, transmitting, or resisting forces.

"That the furrowing of the plates at the riveted joints results from the indirectness of the strain of the steam pressure, is rendered still more probable by the analogous furrowing which results from reciprocating strains of another kind. In the more ancient classes of engines, in which the cylinders are fixed to and work from the smoke-box plates, the alternate forward and backward strains by the steam pressure on the piston have been observed to weaken and to subject to corrosion and leakage the substance of the plate along the edge of the angle iron at the junction with the barrel. In further corroboration of this doctrine, Mr. Colburn states that he is not aware that any accidents from furrowing boiler plates have taken place in the United States; and we believe that their immunity from accidents arising from this source is to be ascribed to the use of very thin boiler plates—one-fourth of an inch to five-sixteenths of an inch in thickness."

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Correspondence

Ingenious Device to Prevent Boiler Incrustations---Letter from an English Engineer.

MESSRS. EDITORS:—Although not an actual subscriber, I have been a constant reader of your valuable paper for years, having more than twelve volumes of it, and heartily wish we had as good and as cheap a paper in England. Now, having received many, very many, useful hints in reading it, I think it my duty to give a little of my experience in water heating, in connection with boiler incrustations—if you deem it worthy a space in your very valuable publication, and trust it may be of benefit to some of your many readers. First, I look on the many advertisements of patents for preventing boiler incrustations as almost useless, although I won't condemn any, not having ever tried one, for I hold if the water introduced into the boiler contains impurities, nothing can prevent its settling somewhere, unless it is frequently blown out. Now, I put up a 10-horse power two years ago, and my greatest fear was from incrustation of boiler, and knowing that by heating the feed water I should lessen it, if not prevent, I concluded the hotter the water the less silex in the boiler. I introduced the feed water from cold-water pump into the exhaust pipe, at about seven feet from heater, as it may be called, for which I made use of a strong cask, holding about 120 gallons; the exhaust steam drove the water in a fine spray into the heater, and deposited its silex all round the inside of the cask, more especially opposite the jet. I took a pipe of the same diameter as the exhaust (3 inches) vertically from the top into the open air, and one, same diameter, one inch lower than the exhaust, to carry off any surplus that might arise at any time from shutting off the feed from hot-water pump; this pipe I put in at right angles to the exhaust, so as not to take any of the jet of spray. This pipe went into a 6-inch drain, 200 feet long, to the reservoir, and condenses four quarts of water in five minutes, or 240 gallons in ten hours; now, after ninety-seven days run I cleaned out the boiler, and found no scale, except a very thin film over the bridge; the greater part of the fire-box had no scale whatever, and, I suppose I had no more than six gallons of mud altogether, but inside the cask I had a coal of hard silex three-fourths of an inch thick, which I removed by means of a hammer and chisel; the cask I furnished with a man-hole complete. I should have said the feed is heated to boiling point by being blown through the exhaust and finely subdivided. I can draw from the hot water feed pipe at 207°, which necessitates my having a slight head above the hot water pump. I find the exhaust being partly condensed in blowing the water through is a relief to the engine's working, although silex forms within it as fast as in the heater, and which has of course to be cleaned out when the heater is cleaned. This spring I replaced the cask for an iron cylinder, seven feet long by fourteen inches in diameter, lying horizontally in a line with the exhaust, and can plainly hear the jet striking hard against the extreme end, being about sixteen feet from where the cold water enters the exhaust pipe. All the other arrangements are the same. I find it necessary to have plenty of room in the heater, otherwise the spray, instead of quietly settling, will be blown up the vertical exhaust pipe into the open air. I am situated over a sand-stone rock, but have no doubt I should find my plan answer as well on a chalk formation as on a sand-stone range.

I hope this article may be of benefit to some of your readers. I receive your paper from Mr. A. J. Chapman, gunsmith, Schenectady.

EBENEZER RUSSELL.

Union Mills, Cranbrook, Kent, Eng., May 11, 1865.

[We are pleased to publish Mr. Russell's communication, and thank him for his good opinion of our paper. We recommend a trial of his device to our engineers. His ideas accord with our own upon this subject. We deem it much better to remove the incrustations from the boiler by preventing them from entering than by employing nostrums for the purpose, which, in the hands of inexperienced persons, are always fraught with danger. The compound Mr. Krause mentions is made in one form as follows:—Powdered charcoal, common soda, and alum, which may be mixed in about equal parts; add to these matters wood dust, and mix the whole together. This will remove incrustation from old boilers, and prevent it in new ones.—EDS.

Incrustation Powder Swindles.

MESSRS. EDITORS:—Your valuable paper serves to spread so much useful knowledge among the mechanics and all producing classes of the country that I think it is but the duty of every reader of the SCIENTIFIC AMERICAN to assist you in your work to free the mechanic and manufacturer from all individual taxes that are everywhere imposed upon the ignorant. Being opposed to all secrecy and secret compounds for any use whatever, and the venders thereof, because nine times out of ten, if the facts are known, they are either worthless or have been known in the scientific world for years; as, for instance, the case you reported, "How to make *Aqua Regia*," as one of the secrets sold to an ignorant party. I wish to report you a case of great usefulness to all who use steam boilers, to prevent boilerincrustations. Boiler incrustations are caused (except on salt water) by the crystallization of lime, etc., held in solution by the water with which the boiler is fed, and water will only dissolve a small portion of lime and other earthy substances if saturated with carbonic acid, which is the case with most all well and river water; and, as the water is evaporated, the lime, etc., crystallizes on the iron. To prevent this, all that is necessary is to drive the carbonic acid out of the water as fast as it enters the boiler, and the lime will then not crystallize, but form a mixture with the water like an insoluble fine powder, which can be swept out of the boiler; or, if the water is let out at the beginning of boiling produced by a quick fire, after the water has been cold, this powder will leave the boiler with the water in almost every instance.

The substance which will produce this action of depriving the water of its carbonic acid is common wash soda—carbonate of soda; one or two pounds in a boiler, from ten to twenty horse-power, will do this most effectually until the water is let out. The action is simply that of depriving the water of the carbonic acid, the soda forming a bicarbonate of soda wherever the water of a lower temperature enters the boiler; and as soon as the bicarbonate of soda is heated to the temperature of the steam, it again parts with one half of its carbonic acid, which is immediately carried off with the steam, and thus the soda will renew its work as long as there is any in the boiler.

I have used soda for more than ten years with success, and it is my impression that all incrustation preventive mixtures are nothing but soda mixed with something else to hide its real character. An incrustation powder sold extensively in the West, chemically analyzed, proves to be nothing but soda mixed with sawdust, and then baked to give the sawdust a brown mysterious color, and to make the world believe (as the agent informed me when I told him that it was sawdust and soda) "that every pound of it was imported across the Atlantic," and sold here at thirty cents per pound—about eight pounds of sawdust with one pound of soda; a very profitable secret to deal in, indeed. This powder has the certificate of a number of our best mechanics in the West as a very efficient preventive of boiler incrustations, and to stop leakages, etc. Soda will prevent incrustations, and sawdust will, of course, fill up cracks, but this might be procured at one-thirtieth of the cost, soda at eight cents and sawdust for nothing.

F. W. KRAUSE.

Chicago, Ill., May 22, 1865.

Light and Heat from Water Power.

MESSRS. EDITORS:—There is a stream of water running near my house in which I propose to set a water wheel which shall turn a magneto-electric machine to produce a current of electricity. This current of electricity shall decompose water, and produce oxygen and hydrogen gases; I will bring these together in a Dr. Harris's compound blowpipe, and burn in a manner to produce the calcium light which will light my house. Without producing the calcium light I think I can expand the heat produced at the blowpipe, and so do my cooking, and warm my house, with water, as well as to burn a cold water candle. Why not? B. P. R.

Hartland, Vt., May 31, 1865.

[If you have power enough you may produce the electric light, but it will require a very large magneto-electric machine, and the light is not sufficiently diffused for ordinary illumination. The amount of heat that you will obtain will be very small indeed in proportion to the power expended, though the fire will be the cleanest and most perfect of all fires.—EDS.

The Center of the Earth Composed of Gold.

MESSRS. EDITORS:—The question as to the kind of matter composing the interior of the earth has long been one of considerable interest among that class of men who "dare to think;" and though our present knowledge of facts does not allow us to answer it in a positive manner, yet, I think it does enable us to draw conclusions which, at least, are highly probable.

When we consider the constant and never-varying changes to which the universe of matter is subject, we must conclude that there was a time—though that time be almost infinitely remote—that our world, as such, did not exist. Though as to the mode of its origin, and the time at which it first took its place among the spheres as an independent body, we can hazard nothing more than vague conjectures. It may have been hurled forth as a fragment from some mighty sphere, and thus attained an independent existence; or, it may have been by the collection into one body of a number of fragments or smaller worlds. But what would seem to be most probable, is, that it attained its present independent position by the condensation of a vast collection of gases, vapors and fluids, which had gathered around some ærolite or fragment, which served as sort of nucleus.

This latter idea concerning the mode of the earth's origin, seems to be the one most generally entertained by those who have given attention to the subject. But be this matter as it may, there is one thing which the teachings of geology so clearly established that it does not admit of a doubt, that at some remote period there must have been a vastly greater proportion of the earth in a gaseous and fluid state than at the present time.

Accompanying this idea a very singular and absurd notion has gained the popular ascendency, that is, that the gradual cooling of the earth took place first at the surface, and that during the gradual change of the gaseous to the fluid, and the fluid to the solid state, a sort of crust was formed upon the surface, while the center still remained a fluid mass. No idea on the subject could be much more contrary to the known laws of matter. This notion, doubtless, arose from the idea that heat was a material substance, and would have to pass off from the earth before it could cool; whereas, the more modern researches into science show that heat is no more a material substance than motion, gravitation or magnetism, but that it is merely a condition of matter, and that, in the case in question, instead of passing off from the earth it would only become, by a gradual chemical action, fixed or latent. But even supposing that the cooling would, or did, take place first at the surface, it is a well known fact that all substances (water in a state of ice excepted) increase in density and weight as their heat is diminished, so that the cooler portions would be the first to sink from the surface toward the center. There are many other very absurd notions prevalent among the masses upon this subject. Some suppose that the interior of the earth consists mainly of water; this could not be, since water has a specific gravity inferior to nearly all the mineral substances; though it doubtless penetrates to a great depth through the crevices. Others suppose that its interior is one melted and burning mass, and that the volcanic mountains serve as chimneys to this great internal fire. Prof. Sims maintained, with considerable force of logical reasoning, that there is a vast hole running through the center of the earth from pole to pole. I once heard a distinguished clergyman maintain that the infernal regions were located in the center of the earth, according to which idea it is to be the future and eternal abode of nearly the entire human race,

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and should command our utmost attention. For my own part I have quite a "golden" idea upon the subject—that the interior of the earth is abundantly supplied with, if not mainly composed of, gold, platinum and other precious metals. If we suppose but for an instant that the earth was once in a gaseous or fluid state, is it not quite evident that those substances most difficult of fusion, and possessing the greatest specific gravity, would be the first to find their way to the center? Now gold, platinum and a few other of the precious metals, possess these properties in a high degree above all other known substances, and though we know them to be scarce on the surface of the earth, we have no assurance but that they are abundant in nature. In view of these facts, is it not reasonable to suppose that these substances rapidly increase in quantity as we approach the center of the earth?

But it may be said that this probable or possible increase depends upon the idea that the earth was once mainly in a gaseous and fluid state. But even supposing that such never was the case, and throwing aside all possible and probable changes which the earth may have undergone, and taking only such changes as the learned geologist, who has carefully studied the chemical composition, structure and general position of the various strata of rocks, must know have actually taken place, we would ask, would it not be the constant tendency of these substances, being so much heavier and more difficult of fusion than other substances, to work away from the surface toward the center? And is it not probable, in view of the properties of these metals, and the known changes which the earth has undergone during the myriads and myriads of ages it must have existed, that they do actually increase in abundance as we approach the center portions of the earth. Indeed it is a matter of wonder that they are to be found at all on the surface, and such a fact can only be accounted for by the supposition that they exist in great abundance in nature.

It may be further urged in favor of this theory that these metals occur in nature invariably in a metallic state, and but little alloyed with other metals.

JOHN CALVIN MOSS.

[The specific gravity of the earth is only about one-third that of gold, the earth being 5½ times heavier than a mass of water of the same size would be, and gold more than 19 times heavier than its own bulk of water. Consequently the earth cannot be nearly all gold, though the idea that there is a great deposit of gold and platinum at the center may not be improbable. The specific gravity of the earth has been measured by three different methods.

A commission, of which Dr. Franklin was a member, measured the contents of the mountain Schehallien, in Scotland, and from the specific gravity of the rocks of which it was composed, computed its weight. Then a ball was suspended by the side of the mountain, and, by observations on the stars, the extent to which the ball was drawn from a vertical position, by the attraction of the mountain, was ascertained. From this the relative power of the mountain and the earth in attracting the ball, and hence the relative weight of the two, was computed.

A second plan, tried by Cavendish, was to measure the attractive force of a large leaden ball by means of a torsion balance.

A third plan, which was tried by the Italian astronomers, Plana and Carlini, and which has been recently repeated by Professor Airy, is to observe the effect upon the oscillations of a pendulum produced by varying its distance from the center of the earth.

The first method gave the specific gravity of the earth	4·95
The second	5·48
The same repeated by Baily	5·44
Plana and Carlini's result was	4·95
Professor Airy's was	6·56
The mean of these is	5·44

EDS.

THERE are some lines of railroad in this country running side by side. The Morris and Essex and the New Jersey Transportation Company, are examples. Trains on these roads start at the same hour and for three or four miles run side by side so close that passengers reach out of the windows and shake hands with each other when running 25 miles an hour.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Hats and Caps.—The object of this invention is to thoroughly ventilate a gentleman's hat or cap, and it is effected by securing the sweat lining upon the interior of the hat body in such a manner that a space will be left all around between it and the body proper, through which space air is freely admitted to the hat, and after circulating through it escapes at the ordinary ventilating apertures made in the top or sides of the hat. A good and thorough ventilation is secured by this arrangement; the hat easily adjusts itself to the head, and has, in every respect, the appearance of a hat having its sweat lining attached in the usual manner. This invention is applicable to any style of hat or cap now in the market, and any one wearing a hat having this ventilating arrangement will experience much comfort and relief during the hot and sultry weather of the summer months—the head being always kept cool. The inventor of the above is Chas. L. Rahmer, Brooklyn, L. I., and the hats are now being manufactured by Messrs. Spruham & Rahmer, No. 21 Park Place, New York City.

Apparatus for Making Extracts.—This invention relates to an apparatus which is particularly intended for extracting oil from paraffine, but which can also be used for making extracts of any other material. The invention consists in subjecting the material to be extracted to the pressure of the atmosphere by placing it in a tank with a perforated false bottom, and forming underneath said bottom a more or less perfect vacuum. The means employed for producing the vacuum are of different kinds, and can be varied as may be convenient. Patented in the United States and in Europe through the Scientific American Patent Agency. Lyman Smith, Erie, Pa., is the inventor.

Watchman's Time Detector.—This invention relates to an improvement in that class of time detectors on ~~which a patent~~ was granted to John Buerk, Jan. 1, 1861. In that case a strip of paper is used stretched on the circumference of a drum, to which a rotary motion is imparted by a clock or watch movement, and a series of spring points serve to perforate this strip according to the same, when these points are operated by a series of keys of peculiar shape. On the strips are marked the hours corresponding to hours on the dial of the clock or watch, and the time when one or more of the spring points have been actuated can be ascertained after the strip has been taken off. This construction necessitates a drum in addition to the ordinary clock or watch movement, whereby the expense of the mechanism is increased; and, furthermore, the operation of applying and removing the strips of paper is tiresome, and requires much care. These difficulties are avoided by using a clock or watch with a stationary index and revolving dial. On this revolving dial are fastened removable dials of paper, or other suitable material, with a series of circles corresponding to the positions of the spring points, and these spring points are concealed under the stationary index. By inserting one of the keys, and turning the same round, the paper dial is pierced by one or more of the spring points, and the time when this takes place can be ascertained by examining said dial when the watch or clock is opened. The perforations in the paper dial are made from below, under the stationary hand, leaving a slight beard on the upper surface, and a similar perforation cannot be produced, even if the watch or clock be opened, except if the paper dial is taken off. Jacob E. Buerk, Boston, Mass., is the inventor.

Corset.—This invention consists in a new mode of making corsets and applying the springs used in them, whereby one is enabled to remove them for the purpose of washing the body of the corset, or for any other purpose. Corsets are now commonly made with flat metallic springs inclosed within the stuff of which the corset is made, along the front edges thereof, or else fastened along said edges on the outside of the stuff. In order to unite the edges of the corset on the person of the wearer, the springs are furnished with hooks and eyes or equivalent fastening devices, which are riveted to the faces of the springs or otherwise secured thereto. These springs are fastened to the body of the corset in a permanent manner, with no provision for removing or detaching them for any such purpose as cleaning or repairing the corset, or of renewing or repairing the springs. In consequence of this construction the corset cannot be washed when it has become soiled without wetting, and thereby rusting the springs, and the common course now is to wear a corset without washing it, until it is worn out, and its place is then supplied by a new one. This invention has for its object to construct the corset and apply the springs in such a manner that the latter can be removed at pleasure. James Bowers, No. 540 Pearl street, New York City, is the inventor.

Handle for Sheet metal Tea and Coffee Pots.—The object of this invention is to obtain a sheet-metal handle for sheet-metal tea and coffee pots, and other similar sheet-metal vessels, which may be cheaply constructed, and have a neat and ornamental appearance—far more so than the common sheet-metal and cast-iron handles at present used. The superior class of sheet metal tea and coffee pots are now provided with japanned cast-iron handles, and also with white-metal handles. These, however, retain the heat from the warm contents of the vessel, and are heavy and expensive—so much so as to augment very materially the cost of such articles. This invention consists in having the handles constructed of two longitudinal parts swaged or stuck up in proper form, of sheet metal, and connected together by solder, so as to form a thin hollow or tubular handle. They can be made according to any ornamental pattern desired. The above is the invention of G. B. Halsted, No. 25 Cliff street, New York.

Device for Washing the Blankets of Printing Machines.—This invention relates to a new and useful improvement in means employed for washing the blankets of machines for printing fabrics, such as calicoes, delaines, etc. Hitherto the blankets have been washed by means of rollers placed in a box or tank containing water, and the blanket arranged so as to work in contact with and pass over said rollers, the blanket then passing between pressure or squeeze rollers, in order to have the moisture taken from it before it passes around the cylinder of the printing machine. This plan is defective. In the first place, the pressure or squeeze rollers wear the blanket; and in the second place, the washing rollers, in consequence of being well charged with moisture, bring an excess of the latter in contact with the blanket, and in case the latter is perforated, or has a hole made in it by wear or accident, causes the cloth to which the rubber portion of the blanket is attached or cemented to be separated from the cloth, thereby spoiling the blanket. This improvement consists in dispensing with the pressure or squeeze rollers entirely, and using, in connection with the washing rollers, a "docter" or scraper or a pressure roller, so as to take the superfluous moisture from the washing rollers, leaving the latter only possessed of sufficient moisture to wash the color from the blanket. Thos. W. Clarke, Manchester, N. H., is the inventor.

SPECIAL NOTICES.

CYRUS W. BALDWIN, Boston, Mass., has petitioned for the extension of a patent granted to him on the 2d day of December, 1851, and antedated August 30, 1851, for an improvement in looms for weaving bags.

Parties wishing to oppose the above extension must appear and show cause on the 14th day of August next, at 12 o'clock, M., when the petition will be heard.

ROBERT CRICHTON and James Rees, executors of Henry Carter, deceased, and James Rees, Pittsburgh, Pa., have petitioned for the extension of a patent granted to them on the 26th day of August, 1851, and reissued on the 19th of June, 1855, for an improvement in nut and washer machine.

Parties wishing to oppose the above extension must appear and show cause on the 7th day of August next, at 12 o'clock, M., when the petition will be heard.

Mr. E. S. ALLIN, master armorer at Springfield, has invented a new breech-loading musket, which is highly commended. General Dyer, chief of the ordnance department at Washington has ordered 5,000 muskets of the old model to be changed to breech-loading after Mr. Allin's plan.

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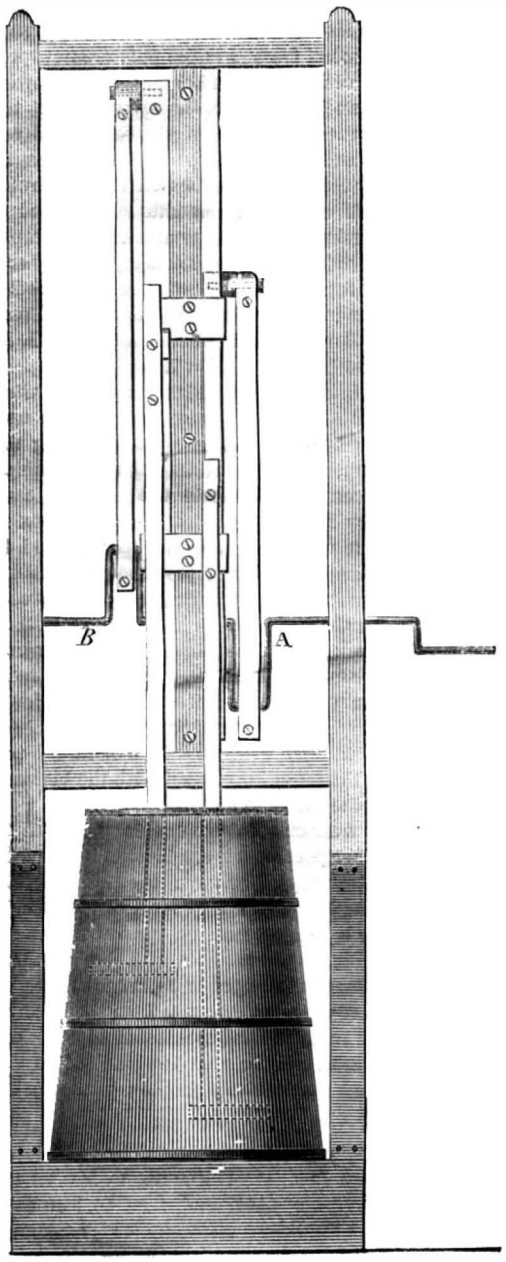
SAYRE'S CHURN.

A great deal of ingenuity has been shown in constructing churns to expedite the process of butter-making. The old-fashioned machines require a long time to bring the butter, and many tedious hours have been spent at it by impatient lads and lasses who longed for more congenial employment.

The object to be attained is to free the butter in the cream from the sack or vesicle in which it is contained, and as this is done by friction, or pounding, it follows that a rapid and thorough agitation of the contents of the churn will produce butter quickly. The inventor of this churn provi des two dashers, operated by a series of cranks, A, and shafts, B, so arranged that the dashers ascend and descend alternately, creating counter currents and causing the globules containing butter to act on one another, and aid in obtaining the end desired.

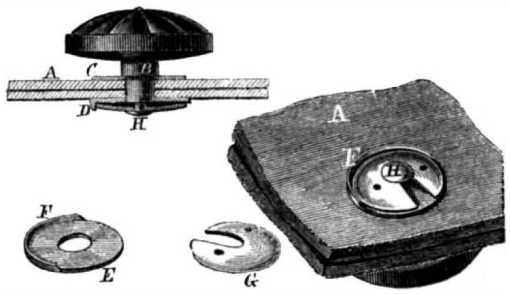


This churn is well spoken of, and was patented by George W. Sayre, of Pisgah, Ohio, August 9th, 1864; for rights in New York, Pennsylvania or Delaware, address Daniel J. Moffat, Washington, D. C.

WILDE'S BUTTON FASTENING.

This engraving represents an improved method for fastening buttons to garments without sewing. The advantages derived are increased strength and durability, saving in time in attaching the button, and, as the result of these, greater economy. Where a number of buttons have to be applied to garments they can be put on much more rapidly than by sewing. They can be inserted by children or other cheap labor, and do not require experience and care to avoid spoiling the work; they are also free from liability to tear out, for by having a wide bearing surface on the under side of the garment the surrounding cloth is sustained and preserved from injury when under strain.

This fastening is also convenient for linen or other coats that require frequent washing, and for buttons that would be injured by water, as it can be easily detached in a moment.



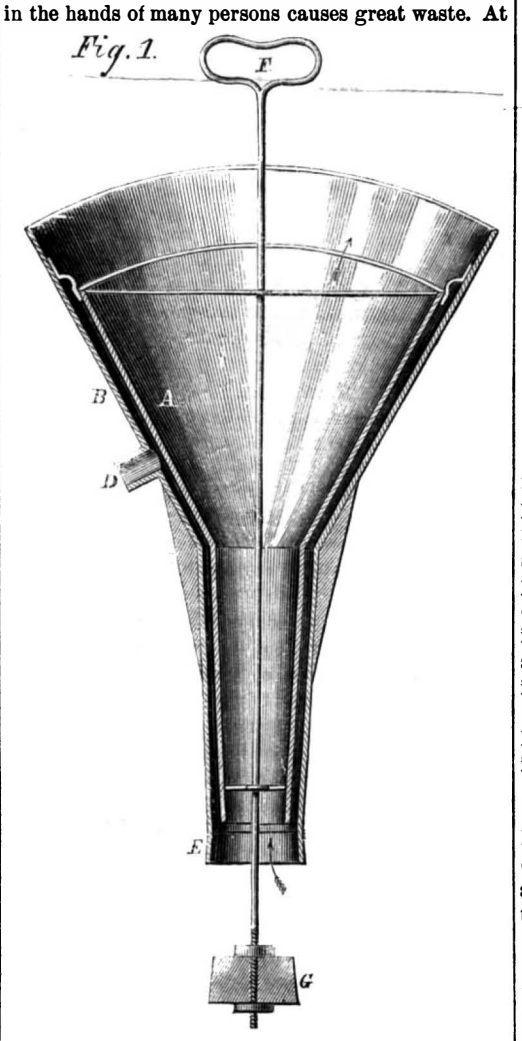
The details of this improvement are as follows:—The cloth is represented by A, and the button has a shank, B, which passes through two washers, C and D—one on top and the other on the bottom. The bottom washer is shown isolated at E, and it will be seen that a flange, F, is raised around half its circumference. The clasp, G, fits over the small stud, H, on the button shank, and also in the bottom washer. The button having been inserted the clasp is put on and turned half round so that the slot in it comes opposite the rim on the bottom washer, thus preventing the button from getting off and holding the same firmly. Where it is not desired to take the buttons out, the clasps may be sprung over the shank and the bottom washer made so as to hold them firmly like a countersink.

This button was patented through the Scientific American Patent Agency on March 14, 1865, by J. F. Wilde. Address patentee for further information at No. 1 Amity street, New York.

LOCHMAN'S LIQUOR-SAVING FUNNEL.

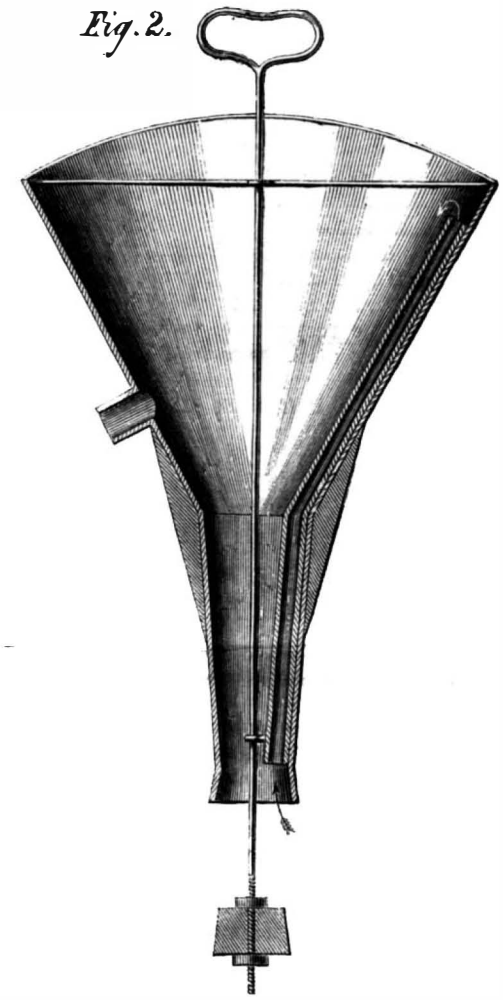
The ordinary funnel is a very imperfect utensil, and in the hands of many persons causes great waste. At the present prices of alcoholic liquors, it is especially necessary to use economy.

Fig. 1.



We publish herewith an engraving of a funnel free from the objections attaching to others, and one that can be easily and expeditiously used, without the loss of any liquid, even in the hands of slovenly people. The construction and use of the funnel is apparent by examining the engraving. In Fig. 1 the funnel is constructed double, or of an inner and an outer part; A being the inner part, and B the outer one, leaving sufficient space for the escape of air between the two. The elastic washer, C, causes the funnel to fit tightly in a vessel when filled. Ordinarily the cock is closed. This funnel is used as follows:—the liquor runs in the top, and when it reaches the nipple, E, rises in it, indicating that the vessel is full, excepting an ullage of the length of the spout (which can be graduated to show the amount), when the funnel is removed, by grasping the handle, F, which, with the connecting rod, moving upward, closes it with the stopper, G. The liquor which may remain in it can then be saved. When a barrel is being filled from a tank and the liquor runs in a continuous stream into the funnel, the cock, D, is opened, and by a tube or gutter connected with another funnel or vessel, into which the liquor escapes when the first one gets full. Fig. 2

Fig. 2.



represents another form of the funnel, on the same principle, having an air-tight tube, H, on the inside for the air to escape, other parts being similar. In some cases a metallic screw cone may be used in place of the elastic washer, C, and the nipple, E, be opened and closed in the manner of a spigot working in a faucet, by a rotary motion of the connecting rod and handle, F, and a movable cullender be placed inside for straining liquids.

This funnel was patented on Feb. 7, 1865, by C. L. Lochman, of Carlisle, Pa.; address him for further information at that place.

ACTION OF PETROLEUM ON THE HUMAN SYSTEM.—Landerer relates the case of a man who swallowed a quantity of petroleum; the greater part he vomited again. It caused a strong burning sensation in the tongue and throat, which were reddened and became swollen. The stomach and bowels were also affected, and slight gastro-enteritis ensued. For several days the urine aud sweat smelt strongly of the oils, and the odor was specially strong under the arm-pits. The patient was very weak for a time, but recovered. —*Chem. Central Blatt.*

IN Troy they are inaugurating a new style of pavement with alternate lines of flagstone, two feet wide and six inches thick, divided from each other by three feet of cobble stones. The wheels run on the former he horses travel on the latter.

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THE POLICY OF STRIKES.

In an article in the New York *Sun* the following sensible paragraph appears:—

"The most effectual method for removing the disputes between capital and labor is by removing the too prevalent notion that there is an 'irrepressible conflict' between them. When workingmen and employers are convinced of the fact that there is a natural partnership between them, in which the former find the labor and the latter the money to carry on the business, and when they fully appreciate the necessity of harmony and concord under that partnership, then strikes or lock-outs will not disturb the 'channels of trade,' or interfere with the rights of every class of our citizens."

This is the view of all sensible people. Strikes are the legacy of a barbarous age—of the days when apprentices were bound—and in no wise a remedy for the evil they pretend to reach. Many well-meaning persons and journals have confused ideas on this subject, and are continually discussing and defending the *right* of men to strike. No one disputes the *right*, but the expediency of such a step. Strikes never bettered any trade; on the contrary, most have been injured by them. Ceaseless agitation of the question of pay has resulted in neglecting the trade itself. Wages forced up for a time by combinations come down again by degrees when the combinations are inactive, so that the last end of the strikers is worse than the first.

Strikes are generally originated by envious dissatisfied men, who, finding themselves falling behind their comrades in pay, create dissatisfaction in order to rise to popularity on the topmost wave thereof. We have always deprecated strikes, and shall raise our voice against them—not because, as has been insinuated by a silly paper, we are interested in reducing the earnings of our fellow-men, but because there is no benefit in the act; on the contrary, the greatest evils ensue. We hear enough in papers interested in fomenting discord between men and their employers about the grand success of such and such a combination, but they never tell us how ephemeral it is, or of the misery and sufferings of the families who want when the father is idle, or of the loose habits and false ideas engendered which fasten on him sometimes for life.

In this country the workman of to-day is often the proprietor to-morrow, and we can look back on many in the course of our experience who once ardently espoused the policy of striking, but now oppose it because of its fallacy. It is a hopeful sign of the times that, with all the demagoguism of the false friends of the workman, there are so few trades that lend an ear to their twaddle, but pursue the even tenor of their way to prosperity and peace, never dreaming that they are abused and downtrodden.

OPENING HOT SAFES.

We find this item in a Baltimore paper:—"The late conflagration at Richmond developed a curious incident and fact which may be valuable, if remembered. Some week or ten days after the fire, the iron safe of the *Enquirer's* office was opened, when immediately on the admission of the air, the books and papers were ignited and consumed. And such was the case of all other safes which were not in brick vaults. In these the contents were uninjured. The *Enquirer's* safe, at the time it was reopened, was cold externally to the touch."

It is very doubtful if the contents would have been preserved had the safes been allowed to become perfectly cold before they were opened. The fact that the books and papers took fire on the admission of air shows that the temperature was at the burning point, but paper is charred and reduced to tinder below the temperature at which it will burn. Any one who has a kerosene lamp may readily try this experiment, for it so happens that the temperature at the top of a kerosene lamp chimney is generally hot enough to char paper, but not enough to set it on fire. It is probable that the paper in these Richmond safes was decomposed, the hydrogen, nitrogen and oxygen being driven out, and mingled with a quantity of steam from the drying of the plaster in the safe walls—the carbon remaining as tinder. On the opening of the door these hot gases were swept out, and as the oxygen of the atmosphere came in contact with the hot carbon, the two entered into that swift combination which is combustion. The same non-conducting properties of the safe walls which enabled them to resist heat for a moderate period, caused them to retain it for so long a time after their interiors had become heated; hence their very slow cooling.

Practically, it might be better to let safes become perfectly cold before opening, because in many cases the paper would not be decomposed, and even if it were, satisfactory proof might in some cases be obtained of the destruction of notes, bonds, or other valuable documents, as writing or printing sometimes remains perfectly legible on paper after it has been reduced to perfect tinder.

The most valuable lesson, however, enforced by the condition of these Richmond safes, is the same that was so impressively taught by the great Troy fire, that iron safes are not to be intrusted with valuable documents unless they are inclosed in brick vaults.

ANOTHER STEP TOWARDS FLYING.

In the proceedings of the Polytechnic Association, published in our last number, was a description by Mr. Barbour of his carbonic acid engine, and he stated that he obtained one and a half horse power from an engine which weighed with all its auxiliary apparatus 450 lbs. This was the power obtained by following the piston with the full pressure only three-fourths of an inch in a stroke of twelve inches. There was also surplus weight in the engine, no effort having been made to reduce the weight to a minimum; the main reservoir was sufficiently thick to bear 5,000 lbs. to the inch, while the maximum pressure used was only 1,100 lbs.; and the reservoir was large enough to run the engine an hour and twenty minutes.

Now if an engine of the same form were made of aluminum, the weight would be reduced to about one-third, say 150 lbs., and then by following full pressure 3 inches instead of ¾ of an inch, the power would be materially increased, though, of course, the same supply of carbonic acid would not last as long. But if an engine could be driven for half an hour, this would be sufficient to travel thirty miles, going at the rate of sixty miles an hour. It would seem, therefore, that it is in the present power of the arts to construct an engine of 2½ or 3-horse power that will not weigh more than 150 pounds. Will these conditions enable us to fly?

A sand hill crane weighs 40 pounds, and it does not seem possible that three sand hill cranes can have the muscular power of one horse; at the first view, therefore, there would appear to be sufficient encouragement for a further examination of the question.

If we allow 180 lbs. for the weight of a man, the whole weight of a machine and its burden will be 330 lbs. If with this weight we have a machine of two-horse power, and if one-half the power be expended in moving the air and the other half in raising the machine, it will rise vertically 100 feet per minute. When sufficient altitude is attained the machine may be inclined, and a portion of the power previously expended in rising may be employed in horizontal propulsion.

Notwithstanding all that has been said to the contrary by our correspondents, a revolving spiral fan would probably be the proper form for the wings, especially as this would be the easiest way in which to obtain the high velocity requisite. It is generally stated that the resistence of the air to a body passing through it increases with the square of the velocity, but Morin says that for very high velocities the formula must contain an element increasing with the cube of the velocity. Calculating, however, an increase only in proportion to the square of the velocity, from the data furnished by Rouse's experiments, a surface 1 foot square moving with a velocity of 146 feet per second, will experience a pressure of 49 lbs. With 6 revolutions per second—360 per minute—to obtain a velocity of 146 feet per second, the fans must be 8 feet in diameter—each arm 4 feet long. As but half the pressure would be available for raising the machine, we should require a total pressure on the air of, say 700 lbs., and this, at 50 lbs. to the foot, would require an area of 14 feet. As there would be two fans with two arms each, this would give an area of 3½ feet to each arm—less than 2½ feet long and 18 inches wide. It will be seen that all the dimensions and velocities are within practicable limits.

The only plan for navigating the air that has any hopes of success is that of flying—beating the air with wings driven by mechanical force; and certainly no machine heretofore proposed comes so near possessing the requisite power in proportion to its weight as a carbonic acid engine constructed of aluminum.

TRAINING UP MECHANICS.

Many years ago a system of apprenticeship prevailed in this country by which youths were bound for a term of years to a master, who agreed to provide instruction in his trade, board, clothes and tuition in return for their services, and, for a portion of the time, pecuniary reward.

We have never heard of any legislation on the subject, but for reasons which are quite apparent the system exists no longer, and youths, instead of being bound, make a verbal agreement to serve out the stipulated period, whatever that may be. To the credit of our young men, but few instances occur where they forfeit their word. The old plan was open to many objections, so many that the evil wrought its own cure, and our shops are purged of it forever. In many cases hard masters starved their apprentices, half clothed them, gave them no schooling, and educated them only in such branches of the trade as they chose, lest in the future they might become rivals and so spoil the business by too great competition.

It was not in human nature to be so treated and not rebel, and if any reader is curious in these matters let him turn back to files of papers, published twenty years ago, and he will find small cuts of a man with a bundle slung over his shoulder on a stick, and an advertisement reading—"One cent reward! ran away from the subscriber an indentured apprentice." What wonder that they ran away? The world does not stand still; and so flagrant were the wrongs alluded to, that, by common consent, the system has been abolished. The times were out of joint. "The Idle Apprentice" is the subject of a series of the most celebrated cartoons of Hogarth, and the idle apprentice of that time was the indentured apprentice, who received blows instead of food, and curses in lieu of instruction. There were few inventions in those days; not because mankind were more degenerate, but because there was no incentive to exertion, and it was much harder then than it now is to introduce any labor-saving machine.

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Since the gradual abolition of the cruel and infamous system of indenturing apprentices to masters a great improvement in the character of our workmen and the machinery they make has been manifested. Our machine shops, a few years ago, were full of English planers, slotting machines, compound planers, screw-cutting machines, etc. Now there are none imported. We can make better machines at much less cost at home. We can make them better and sell them in England at a lower price than they can be manufactured there. This statement is admitted by the London *Engineer* ; (see SCIENTIFIC AMERICAN, page 297, Vol. IX., article "Energy and Aptitude of American Mechanics"); and this in spite of the fact that wages and iron are both higher with us than in England.

Our plan of educating youths in trades, as it exists at present, is the very best conceivable. The term "master," which is especially offensive to the American mechanic, is unknown, and the relation between the workman and his employer is that of good will and a disposition to work for mutual benefit. Instead of learning one branch the apprentice is put through each in turn, and the consequence is a more thorough knowledge of the trade. There is no eye-service in the present plan, and no compulsion; if a youth does not like his business or his employer, he puts on his coat and goes home, and neither carries off his victuals, his clothing, nor his schooling, for he has had neither. This course is the best for both, for every one knows that enforced labor is good for nothing, and a man who has to be watched to do his work is not worth watching.

The character of American machines and American mechanics, is higher to day than it ever was. There are no shops in Europe which turn out more perfect work than the establishment of Sellers & Company, in Philadelphia; A. M. Freeland, in New York; the Putnam Machine Company, in Fitchburg, Mass.; Browne & Sharpe, in Providence, R. I.; Portland Machine Company, in Maine, and hosts of others too numerous to mention; these are only noticed because we know their work; aside from this fact we have never spoken a word to any of their representatives.

English workmen are far behind our own, both in point of dispatch, accuracy of workmanship, personal cleanliness and moral character. We judge from the samples we see among us. They are arrogant, boastful, uneducated, and continually prating about "the Clyde," and what wonderful achievements are performed on that classic stream, or else eternally sounding the praises of Maudsley and Fields, Napier-rs, etc. —to the disgust of our mechanics, who think, not unreasonably, that what "Napier" may do or not do is of very slight importance. Let any man go into the shop of the Waltham Watch Company, where machinists of a high class are employed, and if he can find a cleaner, more intelligent, better dressed set of mechanics, write us word where they can be found, for we want to see them. Comparisons are invidious, however, and it is not in this shop alone that we are to look for steady, intelligent and active mechanics. New England is full of them; so are the other States; and the workshops of the North are the schools where men are taught patience, endurance, and manual dexterity.

In foreign countries you shall find the workmen congregated in beer shops, engaged in dog-fighting, or some low enjoyment. It is not so with us. There are few who do not spend their time in the development of some scheme to make fortunes, or, at the least, become their own masters. That would be a dark day for the trades when we should return to the bondage of signing indentures and making a trade something like punishment for an offense, instead of enlisting all the energies and sympathies of its members in its elevation. We have no fears for any such result, and so long as our present plan is in force will the character of American mechanics maintain its high standard.

INCRUSTATION POWDERS.

We have been many times solicited to puff this or that remedy for preventing deposits in boilers, but have never sanctioned the use of powders in general, for we have felt that an indiscriminate use of them was more likely to result injuriously than beneficially; moreover, cases are frequent where one particular remedy is of no avail. The better plan is to remove the impurity before it enters the boiler, and that this can be done effectually will be seen by referring to the letters which we publish in another part of this paper. We have also given from time to time, in the columns of the SCIENTIFIC AMERICAN, a list of different articles to prevent scale from adhering, and we direct attention to page 107, Vol. IX., for information on this point. Most of the scale powders and nostrums of this sort are composed of the materials there spoken of, and can be bought in any drug store for one-fourth what is charged by agents for the same stuff.

DEFECT IN STEAM ENGINES.

Zealous professors of science occasionally call attention to the fact that steam, as a motor, costs much more than it should, and that little over one-tenth of the actual heating valve of the fuel is realized in practice. Experiments and experience prove the statements to be virtually correct, and it is a reproach to the mechanical skill of the period that it should be.

The loss is not in the theory of the engine, for that is perfect, but in the practice of that theory; or, in plain terms, in the construction of steam engines. It is an undeniable fact, however, that but few of the steam engines now constructed work with the economy that they should, or even approximate in performance to the theoretical value of the fuel.

Portable engines are turned out by scores which, although well enough externally, are far from being in a healthy condition in those parts which affect economy. The slide valves are only such in name; they exercise few of the proper functions of this most important detail, and the boilers are heavy, enormously large in fire and heating surface, and every way disproportioned to the size of the cylinders. The feed pumps are poorly got up; the valves lift too much; the water passages are cramped and crooked, and the absence of any proper method for heating the feed water without creating more loss from back pressure on the piston than is gained by injecting hot water to the boiler is often noticeable. We make these statements for the interest of any it may concern—not to find fault. Many stationary engines are in precisely the same condition.

It is not the only thing required in a slide valve that it shall open and close the ports at a certain time, but that it shall be properly set for the work it has to do, that it shall exhaust the contents of the cylinder at the proper time, that it shall close properly, and that the lead shall be proportioned to the duty. That this is important every one is aware who has ever inspected, or is familiar with, indicator diagrams.

It is a common thing, on railways, to hear a locomotive exhausting "one-sided," as it is termed, or giving palpable public evidence that it is out of order and that the master-mechanic on the line is either indifferent or careless of his duties. We know of one road where our ears are daily saluted by the sound of a locomotive drawing a long train of coaches and regularly exhausting 1-2-3—4, 1-2-3—4, or with a very positive interval between the successive exhausts. It would be quite as sensible to draw two or three empty coaches, day after day, as it is to permit an engine to run in this way; for at every uneven or irregular interval, the steam is compressed or choked in the cylinder, and delayed in getting out until it acquires a high tension, so that the actual pressure is much greater on the exhaust side than on the steam side. This subtracts from the efficiency of the machine, adds to the cost of repair, of fuel and every thing used in running the engine. A locomotive engine, exhausting unequally, carries dead weight which costs a great deal to keep.

We know that engines are often regarded as in chronic or incurable difficulties, because some mysterious cause conflicts with setting the valves properly, but we have frequently found that individuals were more fond of declaring that the defect was very mysterious, than they were zealous to remedy it.

It is very plain, from the simple facts here cited—many of which are so well known among professional engineers as to be truisms—that one of the greatest obstacles in the way of economy in the steam engine is a want of mechanical accuracy in construction, erection and oversight; and that the cost of a horse-power could be very much reduced by attention to obvious and well-known defects existing in steam engines.

The Pneumatic Dispatch Works.

The Pneumatic Dispatch Works, so far as regards the extension of the line from the Euston-square terminus of the London and North-western Railway to the Bull and Gate Station, Holborn, a distance of over a mile and a half, are nearly completed, and the tube will shortly be opened for the transmission of goods and parcels. The new tube is much larger than the first experimental one, and is about four feet high and four feet six inches in breadth. A commodious station has been erected near the arrival platform at Euston, and at the end of this there is an opening in the floor leading to the entrance of the large tube, which is laid beneath some of the busiest streets of the metropolis as far as Holborn Hill, near Hatton Garden, whence it will ultimately be extended to the General Post Office. The engine station, whence the system will be worked, is in the Bull and Gate Yard, Holborn, and the soil in this place had to be deeply excavated to find room for the tubes, which extend from beneath the street into the station, and lie at some depth below its upper works. At the extremity of the yard is the immense circular fan, composed of wrought-iron plates. This fan is a sort of disk containing numerous cellular compartments, with the divisions radiating from the axis of the wheel, the diameter of which is about twenty-two feet. The fan lies in a large chamber, and will be driven by two very fine engines, each of twenty-five horse-power, made by J. Watt & Co., of Birmingham. The machinery is already fixed, and the transit of goods, it is stated, will commence soon. Thus a goods traffic propelled by atmospheric power will be the next novelty for the metropolitan public.—*English Paper.*

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JUNE 6, 1865.

Reported Officially for the Scientific American.

☞ **Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

48,036.—Paper Bag.—James Arkell and Benj. Smith, Canajoharie, N. Y.:

We claim softening the upper parts of paper bags and making them pliable, substantially as and for the purpose above described

48,037.—Stove.—Wm. Bamford and J. F. Tate, Jr., Milwaukee, Wis.:

We claim First, The air chamber, E, provided with one or more draft flues, L L, discharging into the main pipe or flue, D.

Second, The flues, L L, and pipe, I, in combination with an air chamber placed inside of a stove.

Third, The opening or pipe, H, when used for passing the outer air through a heated space and into an inner chamber, provided with flues, as specified.

Fourth, The air chamber, E, flues, L L, pipe, I, pipe or orifice, H, and register, G or F, in combination with the outer case or stove, A, each of said parts and combinations being substantially as set forth and specified.

48,038.—Pipe Coupling.—A. E. Barnard, Cleveland, Ohio:

I claim the cam, F, and boss, D, in combination with the lugs, d c, and opening, e, substantially as and for the purpose set forth.

Second, I claim the recessed chamber, F, packing, J, in combination with the coupling, substantially as and for the purpose set forth.

48,039.—Buckle Attachment.—Wm. E. Barton, East Hampton, Conn.:

I claim the metallic buckle fastening for fastening buckles to straps, constructed as described.

Also the said metallic buckle fastening, in combination with buckle and strap, substantially as described.

48,040.—Sleigh-bell Attachment.—Wm. E. Barton, East Hampton, Conn.:

I claim the within-described metallic bell-holder, cast of brass or suitable malleable metal, having a hole through it to secure the strap, impinging points on the strap side, and on the bell side prongs adapted to enter the bell through suitable holes therein, and hold the same by bending or clenching, substantially as set forth.

Second, The said bell-holder strap and bell, in combination when put together so as to hold the bell loosely and away from the strap, substantially as described.

48,041.—Composition for Lining Oil Barrels.—Julius Baur, Brooklyn, N. Y.:

I claim the employment or use in a compound for lining petroleum packages of chloride of zinc and glue, made substantially as herein set forth.

Also the use in a compound for lining petroleum packages of chloride of zinc mixed with glycerin, as described.

Also a compound made of chloride of zinc, glue and glycerin mixed together, substantially in the manner and about in the proportion herein specified.

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48,042.—Power-gaining Machine.—Henry Bickel, Elizabeth City, N. J.:

I claim the combination of the toggle levers, G H I J K L M, working beam, C, and fly wheels, E R, all arranged and operating as specified.

[An engraving and description of this invention will be published soon in the SCIENTIFIC AMERICAN.]

48,043.—Air Engine.—Dana Bickford, Boston, Mass.:

I claim the combination of the hollow vibrating conduit, H, and the gate, K.

I also claim the combination of the lifting spring, o, with the piston and cylinder provided with the vibratory conduit, H, and gate, K, as described.

I also claim the combination of the hollow vibratory conduit, H, and the gate, K, with the air-compressing reservoir, A, and the open cylinder, M, and the piston, N, thereof.

I also claim the combination of the vibratory conduit, H, and gate, K, with the flexible conduit, G, and the opening, a, thereof, the whole being substantially as and so as to operate as set forth.

I also claim the employment of the mass of liquid in the reservoir, B, with the air pump combined therewith, as set forth, and a piston and cylinder connected therewith, and having a conduit, H, and gate, K, or their mechanical equivalents, as specified.

48,044.—Hoisting Machine.—James Bird, New York City:

I claim the hoisting apparatus constructed substantially as above described, the driving pulley and gear, B C, being placed on the same shaft with the hoisting pulleys and their gear wheel, as above set forth.

[This invention consists in a novel arrangement of power and gear wheels in an apparatus for hoisting heavy weights, whereby the machine is made very efficient and the expense of making it is much reduced.]

48,045.—Corset.—James Bowers, New York City:

I claim a garment connected by means of lacings or their equivalents passing through the eyeletted stays within a duplicate fabric also eyeletted, all substantially as shown and described.

48,046.—Stovepipe Damper.—John Bradshaw and Samuel C. Wilson, Albion, N. Y.:

We claim the employment of the within damper, cast in the form described, and arranged to operate as and for the purpose specified.

48,047.—Thrashing Machine.—C. B. and Wm. T. Brown, Alton, Ill.:

We claim a thrashing machine mounted upon two wheels and constructed and arranged as herein described, so that the operators can stand on the ground, dispensing with the use of a platform.

[This invention relates to a new and useful improvement in the construction of thrashing machines, whereby the same are greatly simplified and rendered capable of being constructed at a much less cost than hitherto, and the machine nearly balanced on its wheels in order to facilitate the operation and the transportation of the same.]

48,048.—Watchman's Time Detector.—Jacob E. Buerk, Boston, Mass.:

I claim, First, The use of a false revolving dial, E, in combination with the stationary index, D, and spring points, d, constructed and operating substantially as and for the purpose set forth.

Second, Producing the perforations on the paper dial or its equivalent from the inside out, instead of from the outside in, as before.

[An engraving and description of this invention will be published in one of the next numbers of the SCIENTIFIC AMERICAN.]

48,049.—Gang Plow.—John C. Brown and G. H. Slimpert, Pinckneyville, Ill.:

First, We claim the arrangements of the hinged adjustable beam, L, with a caster wheel, C, in the manner and for the purpose herein described.

Second, The use of self-locking levers, J J, for raising or depressing the plows, applied to the adjustable guides, d d', substantially as described.

Third, Connecting the hooked rocking levers, J J, to the plow beams by means of bent swinging rods, substantially as described.

Fourth, The laterally adjustable slotted plates, d d', applied to the slotted frame, G, and adapted to serve as guides for the plow beams, F F', and also as bearings for levers which are used to raise and depress said beams, substantially as described.

Fifth, Pivoting the forward ends of the plow beams to rocking bars, a a', which are arranged one in advance of the other, and applying the plows to said beams at about equal distances from their respective pivotal connections, substantially as described

48,050.—Weight-lifting Apparatus.—D. P. Butler, Boston, Mass.:

I claim a weight-lifting apparatus having a construction and capability of adjustment, substantially as described.

48,051.—Weight-pulling Apparatus.—D. P. Butler, Boston, Mass.:

I claim a weight-pulling apparatus having a construction and provision for adjustment, substantially as set forth.

48,052.—Shank Laster.—John Cain and A. B. Cain, Dubuque, Iowa:

First, We claim the compound jaws, b b g g, when the inner jaws are made of leather or other flexible substances, substantially as described.

Second, Extending the edges of the jaws, d d, beyond the toothed or spurred ends of the jaws, b b, substantially as described.

48,053.—Washing the Blankets of Printing Machines.—Thomas W. Clark, Manchester, N. H.:

I claim the employment or use in the blanket-washing devices of machines for printing fabrics, such as calicoes, delaines, etc., of a scraper or pressure roller to the washing rollers, to operate in the manner substantially as and for the purpose set forth.

48,054.—Tool for Cutting Off Boiler Tubes.—Dennis A. Dacey, New York City:

I claim the implement herein described, constructed and operated substantially in the manner set forth, for cutting off boiler tubes and for other work.

[This invention has for its object the construction of a tool for cutting off boiler tubes, and which can also be used for chasing and for tapping holes of any size, and also for drilling and reaming holes in metal, and in general for any use wherein a tool can be operated by a pawl wrench.]

48,055.—Sheep Label.—Chas. H. Dana, West Lebanon, N. H.:

I claim the within described link-shaped label for marking sheep, both ends being fastened closely to the ear, in the manner substantially as set forth.

48,056.—Machine for Attaching Balls to Cartridges.—Darwin Ellis and George R. Stetson, New Haven, Conn.:

We claim the combination of the two shafts, g and k, with the revolving crimper, F, when the whole is constructed, arranged and fitted to produce the result substantially as herein described.

Second, We claim the combination of the two shafts, g and k, with the receptacle, j, and the anti-friction rollers, r r, when they are constructed, located and fitted for use, substantially as herein described.

Third, We claim the combination of the revolving crimper, F, with the receptacles, j, and the anti-friction roller, r r, when the whole is constructed and fitted for use, substantially as herein described.

48,057.—Heddle Frame for Loom.—Milton Finkle, New York City:

First, I claim the adjustable heads, C, constructed in the manner substantially as above described, for receiving the ends of the shafts, A, and rods, a.

Second, I claim the combination of the heads, C, and caps, D, made and applied substantially as above described.

Third, I also claim the stays, D', with hooks or eyes attached, with or without the connecting rods, B', substantially as above described.

48,058.—Stovepipe Damper.—A. V. and A. F. Fletcher, Athol, Mass.:

First, We claim the disk, F, constructed and arranged substantially in the manner shown and described.

Second, The spiral cord, E, attached to a stovepipe damper, substantially as and for the purposes herein specified.

[This invention consists in the application to a circular frame of a disk on the one side, so arranged that when the damper is turned in one position said disk will be pressed tightly against the frame, and thus prevent the heat from escaping up the chimney; but when turned in an opposite direction, will fall away from the frame, and permit the products of combustion to pass freely to the flue or chimney; it also consists in attaching to the opposite side of the frame a spiral coil, made of strips of metal, and so arranged that the smoke, heated air, etc., will acquire a circular motion while passing through the coil, which serves to detain the smoke, heated air, etc., and thus give a better radiation of the heat therein contained.]

48,059.—Carding Machine.—P. S. Haines, Newburgh, N. Y.:

I claim the combination of the shaft, H, and comb, C, with the hanging bearings, N, and clamping nuts, O, substantially as and for the purposes above described.

[This invention consists, among other things, in a new mode of operating the doffer comb of a carding machine, by which it is reciprocated in a nearly vertical direction, and caused to strip the doffer cylinder in a more perfect manner than has hitherto been effected.]

48,060.—Mode of Applying Covering to Roofs, the Decks of Vessels, Etc.—James Hall, Dorchester, Mass.:

I claim as my invention the application of heated metals to the surfaces of the cloth in the process of imbedding the cloth in the paint, uniting the cloth to the surface more firmly and smoothly than can be done without the application of heated metals.

48,061.—Handle for Tea and Coffee Pots.—G. B. Halsted, New York City:

I claim as a new article of manufacture a handle for sheet-metal tea and coffee pots, and other similar sheet-metal vessels, constructed of two longitudinal parts swaged or struck up in any proper or desired form, of sheet-metal, and connected together by solder or otherwise, substantially as herein set forth.

48,062.—Stone-grinding and Polishing Machine.—Jas. Harsha, Circleville, Ohio:

I claim, First, The combination of the carriage, B, gate, D, and inner frame, J, operated substantially as described, so as to secure the vertical rotary, and two horizontal motions, for the purpose described.

Second, The grinder, K, with its orifices, constructed in the manner described, for the transmission of the grinding material to the impinging surfaces.

Third, The scraper, S, in the described relational position to the orifices, R, in the grinder, K.

48,063.—Combined Seeding Machine, Roller and Drag.—Wm. H. Hartman, Fostoria, Ohio:

I claim, First, The oscillating drag, M, provided with a seed-box, V, as and for the purpose specified.

Second, I claim the distributing board, K, in combination with the seed-box, G, and roller, B, when arranged and operating as and for the purpose set forth.

Third, I claim the adjustment of the roller, B, in its relation to the drag, M, as and for the purpose described.

48,064.—Machine for Gathering and Loading Flax, Etc.—G. W. Hatch, Parkman, Ohio:

First, I claim the springs, e, and rake, C, attached to the pieces, B' d, of the frame, and in combination with the adjustable side pieces, E, the carrier, M, elevators, H, and rollers, F F', when arranged and operating substantially as and for the purpose set forth.

Second, I claim the roller or sleeve, F', and shaft, D, in combination with the pulleys, m m', and I J, when arranged and operating substantially as and for the purpose set forth.

48,065.—Ventilation of Mines.—Herman Haupt, Cambridge, Mass.:

I claim the use in mining, tunneling, and other subterraneous operations of steam generators, in combination with a vacuum pipe.

48,066.—Cultivator.—Samuel G. Horning, Mount Carroll, Ill.:

I claim the combination of axle, B, the bar, E, the beams, s s, chains, t, the beams, C C, and braces, O and I, the whole constructed and arranged as and for the purpose substantially as herein set forth.

48,067.—Boiler for Steam Heating.—Henry Howard, Westfield, Mass.:

I claim the boiler, A, for heating water and generating steam when formed, constructed and arranged substantially in the manner herein set forth.

48,068.—Cultivator.—Henry Howe, Darlington, Wis.:

I claim, First, The oblique bars, E E, connected to the draught pole, D, and to the short parts, a a, of the axle, A, in connection with the bars, I I, and driver's seat, L, substantially as and for the purpose set forth.

Second, The plow frames, F F, connected to the bars, E E I I, and shaft, K, substantially as shown, and to admit of being operated as described.

[This invention relates to a new and improved cultivator, designed for plowing corn and other crops which are grown in hills or drills, and it consists in a novel arrangement of parts, as hereinafter fully shown and described, whereby the plows are placed under the complete control of the operator, and rendered capable of being moved laterally, to conform to the sinuosities of the rows of plants, and also of being readily raised and lowered.]

48,069.—Grain Drill.—Joseph Ingals, Milton, Ind.:

First, I claim the spring brace bar, G, attached to the drag bar, and impinging at the curve, h, upon the end of the flange, F, in the working position of the hoe, and having an incline, upon which the point of the flange rises when the hoe is deflected backward, as described and represented.

Second, The indentation, n, on the flange, F, in which the end of the spring rests, detaining the hoe from further backward deflection.

48,070.—Slide Valve.—John G. Ives, Springfield, Ill.:

I claim the combination of the sections or rings, E E, composing the valve, the chamber or space, b, and the apertures, c, for admitting steam to the said space, b, from the space, d, the whole being constructed and arranged to operate in the manner and for the object specified.

[This invention relates to a peculiar construction of slide valves for steam engines, whereby they are made to always form a steam-tight joint with the cage or chamber in which they move. Also in a novel formation of the valve cage, so as to obviate and prevent the valve from abutting or being caught against the edges of the post, as it moves back and forth.

48,071.—Washing Machine.—Josee Johnson, New York City:

I claim as an improved construction of washing machine the sides, 3 and 4, of the tub, A, arranged as represented, in combination with the lever, C, and pounder, E, operating relatively to each other and to the sides, 3 and 4, substantially in the manner and for the purpose herein set forth.

48,072.—Meat Crusher.—Robert V. Jones, Canton, Ohio:

I claim the combination of the roller, C, rotating in fixed bearings, and provided with a crank, D, the roller, C', mounted in sliding boxes, E E, the guide rods, F F, and springs, H H, one of the said rollers being provided with teeth and the other with longitudinal grooves, and all arranged to operate as specified.

[This invention relates to a new and improved machine for crushing meat—breaking the fibers thereof—so as to render it tender and more desirable for the table than it otherwise would be.

48,073.—Breech-loading Fire-arm.—Benj. F. Joslyn' Stonington, Conn.:

I claim, First, The breech block, D, with its pin, d, and concave shoulder, n, in combination with a convex shoulder, m, on the stock or frame adapted to the said shoulder, n, all substantially as set forth.

Second, The block, G, with its projection, k, spring catch, W, and spring rod, H, in combination with the breech piece, D, pin, d, and notched disk, E, the whole being arranged for joint action substantially as and for the purpose herein set forth.

48,074.—Submarine Port-hole Closer.—John H. Kavanagh, Joliet, Ill.:

I claim, First, The combination of the outer and inner valves, G and G', with the outer and inner plates, A and B, surrounding the port-hole, constructed and operated substantially as described.

Second, The combination of the valves, G and G', with their axles, I and I', and scroll springs, L and L'.

Third, The rocking lever cranks, S T U, and S' T' U', and their combinations with the valve levers, N and N', and the wheels of the gun carriage, substantially as described.

48,075.—Shutter Hinge.—Christian F. Kriauer, Pittsburgh, Pa.:

First, I claim a hinge for window shutters, blinds, etc., composed of tangs and shanks, at right angles to each other, and provided respectively with pintles and eyes, substantially as herein shown and described.

Second, In combination with a hinge, so made, I claim the corrugated or roughening of the tangs, substantially as and for the purpose specified.

Third, The double pintle, a, and two projections, e e, on the part, A, of the hinge, in connection with the V-shaped projection, i, of part, C, all arranged substantially as shown, to admit of the hinges being applied indiscriminately to either right or left-hand shutters or blinds.

48,076.—Car Coupling.—G. C. Lawton, Syracuse, N. Y.:

First, I claim the peculiar shaped head, B, of the draw rod, A, with its shoulders, c c, and its extension above and the sloping position at which it is attached to the draw rod, constructed, arranged and operating as substantially described.

Second, The backwardly sloping shoulders, F, in the rear of the gain or slot attached to and projecting from the inner surface of the sides of the buffer head.

Third, The combination of the peculiarly shaped and positioned head, B, with its shoulders, c c, with the double and upwardly and backwardly inclining plane, E E, and the central gain or slot, open at the top, and the backwardly inclining shoulders, F, behind the gain or slot in the buffer head, all constructed, combined, arranged and operating together as substantially shown and described.

48,077.—Corn Husker, Sheller and Cleaner.—C. J. Legg, Penn Yan, N. Y.:

I claim, in combination with the shelling cylinders, B D, constructed as described, and provided with the screen, G, and fan, K, the arrangement of the bagging elevator, M, with the valve, S, the whole operating substantially as and for the purposes herein specified

48,078.—Machine for Tallying Lumber, Etc.—G. R. Lewis, Ashtabula, Ohio:

First, I claim the disks, C and D, in combination with the index, B, and indicator, F, as and for the purpose set forth.

Second, I claim the catch, d, arm, g, and spring, b, in combination with the indicator and disk, D, as and for the purpose set forth.

Third, I claim the cam, I, with the catch, J, and pinion, G, in combination with the disk, C, and cam, h, as and for the purpose set forth.

Fourth, I claim the slide, p, and cam, K, in combination with the indicator, F, and disks, as and for the purpose set forth.

48,079.—Button.—C. M. Loomis, Hartford, Conn. Antedated May 23, 1865:

I claim the employment of the staple, C, in combination with the disk, A, having the curved or concave surfaces inside the button, substantially as and for the purpose herein described.

48,080.—Mining Pick.—Harvey L. Lowman, Virginia City, Nevada:

I claim as a new article of manufacture, the pick, constructed as herein described; that is to say, with an elliptical socket, the opposite sides of which are parallel to each other, and elongated in the line of its axis, in combination with bits merging by curved lines into the central socketed head, as described and represented.

48,081.—Propulsion of Street Car.—Chester M. Mann, Detroit, Mich.:

I claim the arrangement of the lever, G, links, H H, and cranks, I I, in combination with the ratchets, L and M, provided with palls to reverse the motion, and connected by gearing to the driving wheels, for the purpose specified.

48,082.—Mold for Button Making.—George Mathewman and Anthony Leininger, Brooklyn, N. Y.:

First, We claim constructing the lower die in separate parts, B and C, adapted to close tightly around the neck of the eye, E, substantially in the manner and for the purposes herein set forth.

Second, We claim in connection with the above the shelf, c, or its equivalent arranged as represented, and adapted to support the eyes, E, and aid in placing them in the die, substantially as herein before set forth.

Third, We claim supporting the parts, B C, on the bed, A, so that the pressure of the upper die, G, upon the face of the buttons shall cause the parts, B and C, to be sprung or compressed more tightly together substantially in the manner and for the purpose herein set forth.

Fourth, We claim the arrangement of the handles, b c, on the parts, B and C, and standing parallel or nearly parallel to the axis, D, substantially as and for the purposes described.

48,083.—Bag Holder.—L. W. Morlan, New Lisbon, Ohio:

I claim, First, A bag holder constructed and operated substantially as above described.

Second, I also claim the self adjusting rocking plates, E, for holding the mouth of the bags, when they are to be filled, constructed and applied, substantially as described.

[This invention consists in an apparatus made so as to be portable for holding the mouths of sacks while they are being filled with grain, flour or other articles.]

48,084.—Car Spring.—John Murray, New York City:

I claim the peculiar construction of the division plate, C, combined with the boxes, springs and spindles or studs, by which it is made to answer the two fold purpose of a cap and a base for the two boxes and sets of springs respectively; and at the same time acts as a guide and support to the spindles and allows them the required action, as described.

48,085.—Railroad Signal.—Gabriel Natcher, Sidney, Ohio:

I claim the bar, L, laid transversely to the track and porvided with an arm, N, and counterbalance weight, M, for the purpose, and arranged substantially as described.

48,086.—Fence.—William Nevins, Lyons, N. Y.:

I claim the combination and arrangement of the stiffeners, b b, slats, a a, and wires, c c, substantially in the manner, and for the purpose herein set forth.

I also claim forming the posts, B, with the spurs or forks, k k, and notches, m m, said parts being made either entirely of metal, or partially of metal and partially of wood, substantially as herein specified.

48,087.—Steering Apparatus.—Albert H. North, Naubuck, Conn.:

I claim the employment of the cam or eccentric wheels, C E, operated by proper mechanism, substantially as and for the purpose described.

48,088.—Butter-molding Machine.—Amos Nudd, Wampun, Wis.:

I claim, in a butter-molding machine, constructed as described, the catch, or hold fast, consisting of the pawl, f, and notch, g, arranged so as to operate substantially as and for the purpose set forth, in combination with the matrix or molding chamber, C, the two levers, B E, and the expelling plunger, B.

48,089.—Deep Well Pump.—James Old, Pittsburgh, Pa.:

I claim the use of a spring, so placed in combination with the upper valve of pumps for deep wells as to counterbalance wholly or in part, the hydrostatic pressure of the superincumbent column of liquid, and insure the opening of the valve, on the descent of the piston, substantially as herein before described.

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48,090.—Rein Holder.—S. J. Olmsted, Binghamton, N. Y.:

I claim as an article of manufacture the rein holder, constructed substantially as herein recited.

48,091.—Mode of Raising Sunken Vessels.—Austin B. Page, Weaversville, Cal.:

I claim the combination and arrangement of the lever, E, and the crutch, G, or their equivalent, together with the cross timber, I C I H C H F C F and D D D, substantially as and for the purposes herein specified and set forth

48,092.—Hat.—Charles L. Rahmer, Brooklyn, N. Y.:

I claim a flexible band made of metal or other suitable material provided with a series of sharp pointed pins or other proper fastening devices, rubber or other suitable elastic cushions arranged together substantially as described and for the object specified.

48,093.—Sheep Rack.—John P. Ray (assignor to himself and Wesley W. Ray), Honeoye, N. Y.:

I claim the grain trough or receptacle, C, constructed in sections, l l, so arranged as to open and rest against the sides of the box, or to close centrally to feed the sheep, the same being used in combination with the box, A, substantially as described, in combination with the grain trough, constructed as described.

I also claim the double folding and compressing racks, B B, arranged and operating substantially as specified.

48,094.—Mode of Operating Churns.—Jacob Redding, New Castle, Ind.:

I claim the general arrangement of the vertical dashers, C D, pitman, F, crank shaft, G H, gearing I J K L M, drum, S, cord, R, pulley, Q, and spring box, C, all as herein described and for the purpose set forth.

48,095.—Button.—W. H. Reed, Philadelphia, Pa.:

I claim the button, A, with its opening, e, countersunk on the under side of the button, substantially as and for the purpose described.

48,096.—Churn.—Albert Rhoades, Pontiac, Mich.:

I claim the combination with the balance wheel, c, of the lever, G, pivoted to the crank pin of said wheel and to an elastic arm, b, in the manner and for the purposes herein described.

48,097.—Horse Leg Fender.—Stephen Romssan, Hudson, N. Y.:

I claim the former interlining or stiffener, Fig. 5, and the brace, a, when both are inclosed, combined and arranged substantially in the manner and for the purpose herein described and set forth.

48,098.—Piston for Pumps.—Philip C. Rowe, Boston, Mass.:

I claim the elastic cylinder, C, in combination with one or more elastic leather cups, F, with disks and nuts all placed on the piston rod and arranged substantially as and for the purpose set forth.

[This invention consists in the employment or use of a piece of leather, one or more, of cup form, and an elastic cylinder placed on the piston rod and arranged with metal disks and nuts, in such a manner that the leather cups may be expanded so as to operate tightly within the pump cylinder by compressing the elastic cylinder.]

48,099.—Manufacture of Glucose and White Lead.—Robert Rowland, New York City:

I claim the combined manufacture of glucose or grape sugar and white lead in such a manner that both articles are manufactured independently of each other but that the waste gases and vapor arising from the manufacture of the former are used for the corrosion of lead into white lead, substantially in the manner herein described.

48,100.—Snap Hook.—Cyrus W. Saladee, Newark, Ohio:

I claim, First, The buckle-shaped guard, B, with or without the spur, c, in combination with a hook, b, substantially as described and for the purposes specified.

Second, The buckle-shaped guard, D, in combination with a hook, b, substantially as described, and for the purposes specified.

Third, The hook, o, on the end of the spring, C, for the purpose described.

Fourth, The combination of a snap hook, A B, with a buckle, H, when the buckle is provided with an extra bar, I, for the attachment of a strap.

48,101.—Wheelbarrow.—N. C. Sanford, Meriden, Conn.:

I claim the combination of the trussed frame and tilting bottom, substantially as and for the purpose specified.

48,102.—Cultivator.—William G. Savage, Clinton, Ill.:

I claim the arrangement of the plow standards, G G, shafts, F F, and levers, H H, placed within the frame, C, which is pivoted within the mounted frame, A, substantially as and for the purpose herein set forth.

I also claim the connecting of the frame, C, to treadles, I I, in the manner substantially as and for the purpose described.

I further claim the combination of the two frames, A C, with the plow standards, treadles and levers, all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved cultivator or corn plow, and it consists in a novel arrangement of the plows, whereby the driver will have full or complete control over the same, and at the same time a very simple and efficient implement for the purpose specified.]

48,103.—Sail Clutch.—E. T. Sawyer, Portland, Me.:

First, I claim providing on each end of a sail hank or hoop a ferrule, which is constructed substantially as described.

Second, Locking the hoop or hank, and clasping the rope and the sail by means of a clutch or clasp, constructed substantially as described.

Third, The two part clasp, constructed substantially in the manner and for the purpose described.

48,104.—Seed Planter.—Geo. M. and Samuel H. Seward, Guilford, Conn.:

First, We claim constructing the hopper, G, so as to revolve with the disk, E, when the same is combined with the plate, D, and the brush, K, or its equivalent, substantially in the manner and for the purpose described.

Second, Adjusting the hopper, G, constructing and operating in the manner described by means of the screw, P, substantially as and for the purpose specified.

48,105.—Deep Well Pump.—John Sheffield, Pultneyville, N. Y.:

I claim the employment in a lift pump, with two tubular pistons, D D', of the rods, E F, their lower extremities, b b, constituting valves, and bars, d d, substantially as and for the purpose described.

[This invention has for its object the removal of gases from oil and other wells, and it consists in applying a gas or air pipe alongside the well tube through the packing so as to conduct the gases out of the well. It also consists in providing a chamber or trap at the lower end of the well tube, which will prevent the entrance of gases into said tube, but will not obstruct the entrance of oil or other liquids.]

48,106.—Oil Ejector.—John Y. Smith, Alexandria, Va.:

First, I claim the combination of a pipe or tube in sections of enlarged valve chambers, when arranged intermediately between the tube or pipe sections, and concentrically therewith, substantially as set forth.

Second, In combination with a revolving central steam pipe and stationary outer tube, I claim the conical valves upon the former and their valve seats upon the latter, substantially as and for the purpose set forth.

Third, The means herein described of producing condensation of steam in the chambers, for the purpose of raising the liquid or oil, by injecting or dropping a portion of the liquid raised into the said chamber, substantially in the manner herein set forth.

Fourth, I claim the attachment to the revolving central steam pipe of a cam plate, or the equivalent thereof, in combination with stearns or projections on the valve, so that by revolving the pipe the valve shall be lifted off its seat for dropping the requisite amount of liquid for condensation of steam, substantially as set forth.

Fifth, In combination with valve chambers constructed and operated as described, I claim the weighted valve covers, so as to close the valve opening if the external pressure of the liquid exceed that from within, substantially as set forth.

48,107.—Apparatus for Making Extracts.—Lyman Smith, Erie, Pa.:

I claim the combination with the tank, A, of a vacuum pan, F, or other equivalent device for producing a vacuum, substantially as and for the purpose set forth.

48,108.—Thrashing Machine.—Samuel Spencer, Groton, N. Y.:

I claim the concave, D, when attached to the regulating and tightening blocks, B B, to render it adjustable with the elevator, C, when constructed and operated as above described.

48,109.—Horse Rake.—Ariel B. Sprout, Hughesville, Pa.:

First, I claim the foot lever, E, so provided to the rake head as by being depressed to throw the rake from its elevated to its working position, and by being held down with the foot to retain the rake in its working position.

Second, I claim attaching the fulcrum bar, F, to the cleaners or other rigid parts of the rake by means of straps, g, connecting the two parts or a hinge joint, so as to allow a limited amount of vertical play to the bar, F, for the purpose described.

Third, I claim in combination with the straps, g, the movable rings, or their equivalent, for the purpose of preventing the vertical play of the bar, F, relatively to the cleaners, under the circumstances described.

Fourth, I claim the extension in front of the axle of the cleaners, G, which support the rake head, so as by their vertical adjustment to regulate the hight of the rake head from the ground at a given elevation of the shafts.

Fifth, I claim the rotating notched pintle bolt, H h', with grooves therein corresponding to similar grooves on the lug. H', for coiling the rake teeth, until the requisite force is attained, and for holding the tooth when coiled in position under the action of the nut on the bolt.

48,110.—Upsetting Tire.—Albert Stedman, Homer, N. Y.:

I claim the machine or apparatus as a whole, when used in connection or combination with any vise, as and for the purposes above set forth.

48,111.—Carriage Axle.—George Hayward Thomas, New York City:

I claim the mode herein described of securing a wheel upon its axle, the same consisting in the use at the outer end of the axle of a detachable or movable collar or ring, in connection with a nut, the two being arranged together and operating substantially in the manner herein above set forth.

48,112.—Drag Bar for Grain Drills.—J. H. Thomas and P. P. Mast, Springfield, Ohio:

We claim so constructing the arm, F, and lugs, i, that when the pin, g, is in place the said arm will be maintained in position in contact with the face, e, substantially as set forth.

48,113.—Manufacture of Machine-sewed Shoes.—Edwin Thompson, Abington, Mass., and L. N. Mears Brooklyn, N. Y.:

We claim the process or method of temporarily uniting the vamp and sole of a shoe for their subsequent union by stitches, substantially as set forth.

48,114.—Axle for Wheel Vehicles.—Jonathan G. Tibbets and W. M. Merriel, Jeffersonville, Ind.:

We claim a divided axle, or one composed of two parts, A A', connected by a bridge or skeleton hub, composed of the heads, B C D, and brace rods, E, arranged and applied to the axle in the manner substantially as and for the purpose herein set forth, and the ends of the parts, A A', fitted together by a cone joint.

We further claim providing the heads, B D, with radial openings or air passages, and having said heads bushed with Babbitt metal, substantially as herein described.

[This invention relates to a new and improved axle for wheel vehicles, such as are generally termed compound axles, on account of being composed of two or more parts so arranged that one part may rotate independently of the other. The invention consists in a peculiar construction of the axle, whereby the same is rendered strong and durable, and at the same time light, and capable of being kept perfectly lubricated, so as to run with but little friction.]

48,115.—Coal Stove.—W. B. Treadwell, Albany, N. Y.:

First, I claim a parlor-heating stove, with an oven for cooking purposes, so constructed that hot air circulates in a chamber formed in the bottom of the oven, and also through the chamber of the body of the oven, substantially as and for the purposes described.

Second, The construction of the oven, which is a component part of a stove, with a double bottom, a double walled hole coverer and circulating passages for hot air, substantially as and for the purposes described.

Third, The fire-pot or chamber, C c l f, constructed as represented in Figs. 1 and 2, and substantially as herein described, for the purpose set forth.

Fourth, The combination of the plate, H, with removable section, u', and a fire-pot having a removable sectional lining, f, substantially in the manner and for the purpose described.

Fifth, The combination of fire chamber, C, cavity, g g, cold-air passage, o o, and receiver, E, substantially in the manner and for the purpose described.

Sixth, The cold-air passage, formed by means of plates, b b and c, connected with cavity, g g, in combination with the ring or receiver, E, tubes, s s, and oven, D, all constructed and arranged substantially as described.

48,116.—Window Blind.—Albert Van Wagenen, Boston, Mass.:

I claim, First, The method herein described of constructing window blinds so as to admit of the ready removal of the slats, in the manner and for the purpose set forth.

Second, The method described of maintaining the slats of window blinds at any given inclination with respect to the frame by the means and in the manner herein set forth.

48,117.—Seed Drill.—A. H. Wagner, Chicago, Ill.:

I claim the vibrating feeding tubes, H, provided with a partition across the lower end to stir the grain and feed the drilling tubes.

In combination with the vibrating feeding tubes, H, I claim the receiving cups, R, with curved inner bottoms to hold the seed until it is pushed off by the vibrating tubes, substantially as described.

I claim the hook on the lever which raises the link from the wrist pin simultaneously with the raising of the drilling teeth.

48,118.—Vegetable Slicer.—Sylvenus Walker, New York City:

I claim the guides, b b', forming the sides of the knife stock, A, with the adjustable mouth-piece, B, and spring, C, when formed of one continuous piece of metal, substantially as described.

48,119.—Cigar.—Chauncey Walton, Washington, D. C.:

I claim the new article of manufacture herein described, made in the manner and for the purposes substantially as set forth.

I also claim a longitudinally-perforated cigar, combined with a sponged mouth-piece, as and for the purposes set forth.

48,120.—Throttle-valve Gear.—H. W. Warner, Greenfield, Mass.:

I claim the combination and arrangement of the male and female screw, F, male screw, B, and nut, E, for the purpose of operating and controlling the throttle valve of a steam engine, substantially as herein set forth.

48,121.—Lever Buckle.—H. W. Warner, Greenfield, Mass.:

I claim the projections or handles, b, one or more, in combination with the tongue of a lever buckle, substantially as and for the purpose herein set forth.

48,122.—Boot-jack.—Jonathan Wheeler, Athol, Mass.:

I claim the boot-jack herein described, consisting of the fixed platform, A, vibrating platform, B, supported upon pivot pins, C C, and provided with a projection, c, curved jaws, D D, approaching each other, longitudinally arms, a a, standards, b b, and slots d d, the whole constructed and arranged as set forth.

[This invention consists in a peculiar mode of constructing boot-jacks, by which they are simplified in construction and operation.]

48,123.—Knob Latch.—Albert Williams, Norwich, Conn.:

I claim the arrangement of the slotted arbor with the dead and slide latches and knob, substantially as shown, so that the dead latch may be operated or thrown back by the insertion of the key through the knob and arbor while the latter is used for operating the slide latch, as described.

[This invention consists in combining in a novel way a dead latch and an ordinary slide latch in such a manner that the slide latch may be operated by the turning of the knob-arbor as usual, and the dead latch operated by a key, the hole for which passes through one of the knobs and the knob-arbor, whereby a very simple, economical and efficient lock is obtained, and one that cannot be readily picked or opened illegitimately.]

48,124.—Device for Steering Boats from another Boat.—J. D. Willoughby, Washington, D. C. Antedated Nov. 24, 1864:

I claim attaching the steering cords, f f, to the cross tiller, c, or rudder, B, and passing them around some point on the boat, so as to cause the tension of either cord to pull the rudder into a position that will incline or steer the boat in the same direction that it is inclined by the tension of the cord, substantially as described and represented.

48,125.—Boiler Furnace.—Thos. B. Wilson and Wm. R. Shaw, Meadville, Pa.:

First, We claim the deflector, C, arranged as shown within the furnace, and operated by means of the hand lever, A, without, substantially as above described.

Second, We also claim the combination of the deflector, C, with the door space of the furnace, and the air box, E, opening into said space, substantially as above described.

[This invention] consists in the arrangement of an air-deflector within a furnace and over its mouth, for the purpose not only of regulating the amount of draught to the fire, but also of directing the draught so that the air will become thoroughly mixed with the gases arising from the fuel, and a more perfect combustion be thereby obtained.]

48,126.—Sash for Roofs of Hot-houses.—J. N. Woodward and W. Holden, Aurora, Ill.:

We claim the sheet-metal strips, constructed with gutters, c c, and employed in combination with the sash, A, glass, B, and putty or luting, b, in the manner and for the purposes described.

[This invention consists in covering the upper or outer portion of the sash with sheet metal, and using in connection therewith putty or other suitable cement or material, whereby the sash is rendered perfectly tight and water-proof, and far more durable than the sashes as now glazed.]

48,127.—Bread Cutter.—Joseph Buckett (assignor to himself and L. W. Warner), New York City:

We claim the combination with the eccentric circular cutter, D, projecting plates, E E, shaft, B, opening, F, of the holder, G, composed of a series of plates, a, connected by joints, b, substantially as and for the purposes described.

[This invention consists in the employment or use of a cutter of circular form, attached eccentrically to a shaft, placed on a suitable framing, the cutter working between plates which have an opening made in them, into which the article or substance to be cut is fed to the cotton; the frame or table on which the article being cut is placed having a holder applied to it, composed of a series of jointed plates, whereby the desired work may be accomplished with the greatest facility.]

48,128.—Lamp.—Mills L. Callender (assignor to the Callender Lamp Manufacturing Company), New York City:

First, I claim sustaining the cone or deflector by supporters that are bent or folded, to increase their length, for the purpose and substantially as specified.

Second, I claim the plate, h, extending across the deflector, g, and having an opening with lips, i i, composing an inner deflector, and formed with the flame-spreading projections, 2 2, as and for the purposes specified.

Third, I claim the elastic ring, a, with an opening through which to fill the lamp, in combination with the slide rods, c c, carrying the burner, as set forth.

48,129.—Sad Iron.—Robert Drake, Newark, N. J., assignor to himself, Jas. F. Bless and Danl. F. Bless.:

I claim constructing the bottom of the heating chamber of a sad iron with an inclined or curved guding or deflecting surface, r s s, adapted to operate as herein described.

[This invention relates to sad irons heated by a gas flame, and consists in a peculiar construction or formation of the interior of the iron, whereby the combustion of the gas is greatly increased, and also fully consumed before issuing at the chimney of the iron, the importance of which is manifest.]

48,130.—Corn Planter.—John Gross, Decatur, Ill., assignor to himself and Thos. K. Alexander:

First, I claim the employment or use of the circular intermittingly rotating plates, N, provided with openings or holes, j j, in combination with the vibrating seed plates, M, substantially as and for the purpose described.

Second, The vibrating bars, O, placed below or underneath the plates, N, connected with the plates, M, and receiving their motion therefrom, and provided with pawls, m, for the purpose of operating the plates, N, as set forth.

Third, The circular gage, P, placed underneath the plates, N, and arranged substantially as shown, for graduating the capacity of the holes, h, in the plates, M, as set forth.

Fourth, The arranging of the cut-offs or strikes, d, with springs or elastic rods, N', in the manner substantially as and for the purpose specified.

Fifth, The scrapers, A A, at the outer ends of arms, R R, which are connected by rods, t, to treadles, u, substantially as and for the purpose specified.

[This invention relates to a new and improved seed-distributing apparatus, and in an improved scraper, whereby it is believed that an improved machine for planting corn and other seeds is attained

48,131.—Petroleum Stove.—Ira Holmes, Moscow, N. Y., assignor to himself and Scott Lord, Genesee, N. Y.:

First, I claim concentrically arranged lamps or burners with the rotary platform, A C, combined and arranged substantially in the manner and for the purpose set forth.

Second, The pipes, b, leading from each reservoir into the main pipe, B, carrying off any vapor or gases into the same for safety.

Third, The jacket heaters or cylinders with side flues, f, discharging into a central pipe, B, constructed as and for the purpose set forth.

Fourth, The wire gauze, c, located in the central pipe, B, above the entrance of pipes, b, for the purpose set forth.

Fifth, The combination and arrangement of the several parts described, operating in and for the purpose, substantially as set forth

48,132.—Safety Match Holder.—Helen M. Jewett, (assignor to Universal Safety Match Company), Roxbury, Mass.:

I claim a safety match box or holder composed of the match pack and waste receptacles, A B C, and one or more igniting card holders, D, the whole being for use as specified.

I also claim the match safe made of the three receptacles, A B C, and one or more card holders, D, and having the cover, c, of the rearmost receptacle, so constructed as when closed down upon the cover, b, of the pack receptacle it shall entirely overlap it, as set forth.

I also claim the match safe as not only made with a match pack, waste and igniting card receptacles, but with separate covers to the waste and pack receptacles, the same being in order that the pack receptacle may be protected from fire or sparks dropped from a match while in the act of being moved over the pack receptacle for the purpose of being inserted in the waste receptacle.

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48,133.—Breech-loading Fire-arm.—William Morgenstern (assignor to himself and Wm. B. Wilstach), Philadelphia, Pa.:

I claim, First, Raising the rear of the movable breech from its engagement, and retracting it by means of the tumbler lever, H, operated by the hammer in the act of cocking.

Second, The lifting and retracing lever, H, and the tumbler, in one piece.

Third, The swinging cam or lever, J, constructed and arranged substantially as and for the purpose set forth.

Fourth, The combination of the breech piece, C, cam, J, and tumbler lever, H, operating in the manner substantially as described.

48,134.—Roll for Machines for Preparing Fibrous Material for Spinning, Etc.—Daniel Read (assignor to Amos A. Taylor), New York City:

I claim covering rolls for preparing materials for spinning yarn and manufacturing cloth with an inner covering of vulcanized rubber, gutta percha, or other suitable gums, and with an outer covering of leather parchment, paper, or the equivalent of either of these two coverings, being united together in the manner as and for the purose described.

48,135.—Buckle.—John E. Smith (assignor to himself and Henry C. Griggs), Waterbury, Conn.:

I claim the combination of the frame, a, with the tongue, g, and the hook, h, when the tongue and hook vibrate separately and on independent hinges or joints, though on the same bar, as herein described.

48,136.—Cranberry Gatherer.—Charles Thacher (assignor to himself and George Shove), Yarmouth, Mass., (and assigned by said Thacher to Luther W. Clark, Boston, Mass.):

I claim as my invention the combination of the holding comb, C, with the receiver. A, provided with teeth, substantially as described.

I also claim the combination of the grate or sieve, B, the holding comb, C, and the receiver, A, provided with the teeth, substantially as described.

48,137.—Cherry-stoning Machine. — Theophilus Van Kannel, Cincinnati, Ohio, assignor to himself and Joseph Beaire, Chester, Ill.:

I claim, First, So applying the needle carrier, g, to a reciprocating slide that the needles, b, will discharge the pits from the pulp and then assist in discharging the pulp from the machine, substantially as described.

Second, In a machine for stoning cherries, which has a rotary driving shaft, I claim giving a lateral motion to the needle carrier in the act or removing the pulp from the basin, substantially as described.

Third, Constructing the needle carrier with a nose, g', for the purpose substantially as described.

Fourth, The feeder, b, arranged to work between the hopper, A', and the basin, a, substantially as described.

Fifth, The employment of an elastic perforated bottom for the basin, a, substantially as described.

Sixth, The arrangement of the hopper, A', feeder, b, basin, a, and discharging spout, A2, so that cherries will be moved from one to the other of these contrivances, deprived of their pits, and discharged from the machine, substantially as described.

48,138.—Artificial Leg.—James W. Weston and Thomas B. Stanley (assignors to James W. Weston), New York City:

We claim, First, A bolt formed with two joints at right angles to each other, and secured to the leg and foot respectively, as set forth, so that the foot cannot turn out of its place, but motion is allowed at the ankle, as specified.

Second, We claim the india-rubber block perforated with holes or formed with cavities at those points where the spring is required to be most yielding, the same being introduced at the ankle joint, as specified.

Third, We claim the side knee-pieces extending from the artificial limb, as and for the purposes set forth.

Fourth, We claim the band for attaching the artificial limb, consisting of the strap, l and m, and intermediate laced strap or webbing, n, for the purposes and as specified.

48,139.—Steam Engine.—Robert Wyatt (assignor to himself and W. Larder), Brooklyn, N. Y.:

I claim, First, Connecting the two pistons, B C, with a crank outside of the cylinder, by means of a piston rod, D, which is attached to the inner piston, C, and passes through the outer piston, B, and which has a longitudinal movement with the inner piston, C, and a lateral movement with the two pistons, B C, substantially as and for the purpose herein specified.

Second, The stuffing box, E, through which the piston rod, D, works, attached to the outer piston, B, and working in a slot, f, in the cylinder, substantially as and for the purpose herein set forth.

Third, The sliding plate, F, and its socket, F*, fitting the stuffing box, E, and working within a groove or guide, g, on the exterior of the cylinder, substantially as and for the purpose herein set forth.

Fourth, The combination of the slide valve, M, and the two connected slide valves, N' N3, the three worked by two eccentrics, Q S, and operating as described in relation to a system of ports o o' o2 o3 p s' s3, arranged substantially as herein specified.

48,140.—Oil Press.—John Marshall, Pentonville Road, Eng. Patented in England Oct. 27, 1863 :

I claim the expression of oil from oil-yielding substances, and the production of oil-cake and other residuary matter, by means of a chamber, in combination with a ram and plug and a strainer or filter, these parts being constructed and acting substantially as described.

48,141.—Machine for Making Cigarettes.—Manuel J. Lopez y Manoz, Havana, Cuba:

I claim, First, The arrangement of the feeding rollers, G G', connected together and pressed together in the manner specified, and worked by means of gearing, in the manner and for the purpose substantially as described and set forth.

Second, I claim the arrangement and combination of the cutting bar, K, and knife, L, worked by means of a segment, L', in the manner and for the purpose substantially as set forth.

Third, I claim the manner of working the forming rollers, v w, by the pinions, 12 13, in combination with the pinion, 14, when said pinions, 12 13, form part of the surface of said rollers.

Fourth, I claim the arrangement of the frames, X X', swinging upon central slides, y, attached to the frames of the machine, and secured in its place during the operation of the machine by spring levers, r', and a lever, E, acted upon by a cam, F', in the manner specified.

Fifth, I claim the arm, q, and the pin, q', or their equivalent, acting upon the spring levers, r', for the purpose of disengaging the same, in combination with the pin or projection, p', acting upon an arm, p, fast to the said frames, X or X', for the purpose of swinging said frames around central studs, y, the whole operating together in the manner and for the purpose deseribed.

Sixth, I claim the wheel, W', acting upon the pinion, W", and the pinion, 5, operating through the pinions. 4 and 6, the forming rollers, in the manner substantially as described.

Seventh, I claim the forming levers, N, attached to a crank shaft, O, and operated by teeth 24 25 26, and pins or projections, 27 28 29 30 and 31, in the manner and for the purpose substantially as specified.

Eighth, I claim the arm, b, in combination with the spring lever, x, and the cam, n, in combination with the lever, n', acting on the crank shaft, O, and the forming lever, N, in the manner described and set forth.

Ninth, I claim the lever, T, acting upon the forming lever, N, and operated by arms or cams U and U', substantially as specified.

Tenth, I claim holding the rolled cigarette firmly in its place while the ends of the paper are closed by means of the lever, T, operating in the manner specified.

Eleventh, I claim the levers, Q, operated in the manner specified, or its equivalent, for the purpose of turning down the upper parts of the paper at the ends of the cigarettes.

Twelfth, I claim the levers, R' R', operating and arranged in the manner and for the purpose substantially as set forth.

Thirteenth, I claim rolling the cigarette by the combined action of the rollers, v w v' w', and a lever, N, as described.

Fourteenth, I claim holding firmly the paper while being cut, by the action of the knife, L, by means of the feeding rollers, G G', and by the forming lever. N, while the latter is acting upon the tobacco and distributing the same evenly on the paper.

Fifteenth, I claim the combination of the feeding rollers, G G' the bar, K, and knife, L, the forming rollers, v w v' w', the forming bar, N, the lever, T, the levers, Q Q, and the levers, R' R', when arranged, combined and working together in the manner and for the purpose substantially as set forth and described.

Sixteenth, I claim the construction of the wheels, H W' E and W, attached to the driving shaft, and operating the different parts of the machine, in the manner and purpose as set forth.

48,142.—Lamp Burner.—James Wood, Nottingham, Eng.:

I claim the combination of the door, B e e, thumb piece, e, stops, g h (all made out of one piece of metal), with the guides, f, the latter being formed of strips or pieces of the shell, a, of the burner, in the manner and for the purpose herein described.

[This invention relates to a new and useful improvement in that class of lamp burners which are provided with chimneys for burning coal oils and other similar hydro-carbons, and it consists in a novel manner of applying a door in the side of the burner, whereby a ready means is obtained for lighting the lamp without removing the chimney from the burner, and without adding in an appreciable degree to the cost of the construction of the burner.]

48,143.—Coal Stove.—Philo P. Stewart, Troy, N. Y.:

I claim, First, The employment of the perforated cone or cap, F, constructed. arranged and combined with the said plates, C and D, and with the fire pot and combustion chamber of a stove, in the manner and for the purposes substantially as herein described and set forth.

Second, I claim the employment of the wire gauze door, P, or its equivalent, in combination with the said perforated cone or cap, E, or any equivalent therefor, and with the said radiating chamber, B', in the manner and for the purposes substantially as herein described and set forth.

Third, I claim the perforated cone or cap, E, constructed and arranged in sections, a b c, with small apertures between each section or division, in the manner and for the purposes substantially as herein described and set forth.

Fourth, I also claim the arrangement and employment of the inner vertical tube or conical cylinder, L, and the outer vertical tube or cylinder, E, in combination with the radiating chamber, B', and with the horizontal flue, g g, in the manner and for the purpose substantially as herein described and set forth.

Fifth, I also claim the arrangement and combination of the vertical radiating tubes or columns, G G G G, with the return flues, e and f, in the manner and for the purpose substantially as herein described and set forth.

Sixth, I also claim the said flanges, i, constructed and arranged upon the outside of the said perforated cone or cap, E, in the manner and for the purpose substantially as herein described and set forth.

Seventh, I also claim the combination of the said perforated cap or cone, E, or its equivalent, with the air chamber surrounding the chamber of combustion, and communicating with numerous apertures, and the said wire gauze door, P, in the manner and for the purposes substantially as herein described and set forth.

REISSUES.

1,979.—Cock.—Nathaniel Jenkins, Boston, Mass. Patented April 18, 1865:

I claim First, The swivel, H, in combination with the follower, E, and seat. L, substantially as and for the purpose described.

Second, The combination and arrangement of the thimble, I, swivel, H, and packing, K, substantially as and for the purpose described.

Third, A hemispherical, or hemispheridal valve or packing, constructed with a flange, m, substantially as and for the purpose described.

Fourth, The elastic packing, or valve attached to the follower by means of a flange, m, and a corresponding socket, substantially as set forth and specified.

1,980.—Ladies' Collar and Cuffs.—Wm. E. Lockwood, Philadelphia, Pa. Patented April 26, 1859:

I claim an embossed collar or cuff, made of a fabric composed of paper and muslin or an equivalent fabric.

1,981.—Ladies' Collar and Cuffs.—Wm. E. Lockwood, Philadelphia, Pa. Patented April 26, 1859:

I claim an ornamental collar or cuff, made of a fabric composed of paper and muslin or of an equivalent fabric ornamented by printing or otherwise marking on the surface plain or colored devices.

1,982.—Ladies' Collar and Cuffs.—Wm. E. Lockwood, Philadelphia, Pa. Patented April 26, 1859:

I claim an ornamental collar or cuff made of a fabric composed of paper and muslin or an equivalent fabric, ornamented by perforations as set forth.

1,983.—Ladies' Collar and Cuffs.—Wm. E. Lockwood, Philadelphia, Pa. Patented April 26, 1859:

I claim an ornamental collar or cuff made of a fabric composed of paper and muslin, or of an equivalent fabric, ornamented by the interlacing of colored tapes or ribbons as set forth.

1,984.—Street Washer.—Joshua Regester, Baltimore, Md. Patented July 23, 1861 :

I claim, First, A metallic sectional stop-cock case, which is so constructed that in the act of securing the sections together the stop-cock and its appendages are confined within said case, in a permanent position, substantially as described.

Second, Centering the stop cock at its lower end by means of a collar bearing, F, or its equivalent, in combination with a metallic case, substantially as described.

Third, The combination of a twining discharge pipe, B, with a stop cock and a metallic case, which is constructed with an upper and a lower bearing, F, substantially as described.

1,985.—Hydrant.—Charles L. Stacy, Cincinnati, Ohio. Patented Oct. 4, 1859 :

I claim, First, The provision in hydrant piston of a flexible cup, G, or its described equivalent, so arranged as to cover the waste aperture in the act of drawing, and to be pressed against said aperture by the head of water in the discharge pipe, substantially as set forth.

Second, The relative arrangement of the cup-formed disks. F G and G'", and the apertures, K and L, adapted in the manner set forth to form a chamber, I, closed on all sides, with the exception of the ingress aperture, K, while the hydrant is open, substantially as set forth.

1,986.—Spring-back Chair.—Robert H. Staples, Lowell, Mass. Patented Nov. 8, 1864 :

I claim a back swinging independently of a seat, and pivoted above it to stationary supports or the arms of the chair, in combination with a spring or springs, or equivalent device, to return it to its normal condition.

1,987.—Improvement in Stoves by the Use of Superheated Steam upon the Fuel.—The Hagan Manufacturing Company, New York City, assignees to William E. Hagan, Troy, N. Y. Patented March 8, 1864 :

I claim as my discovery or invention in the management of combustion in fire chambers the application, substantially as herein described, of superheated steam in jets, so as to impinge without admixture with atmospheric air directly against the incandescent coals, in addition to or in combination with the supply separately of atmospheric air, either by draft or blast, in the usual manner, as set forth and for the purposes specified.

I also claim in the construction of fire chambers for the combustion of feed, and provided with apertures at or near the bottom for the admission of atmospheric air, combining therewith a steam chamber or chambers for superheated steam, the inner wall of the steam chamber or chambers having numerous small apertures next to the fuel for the escape of the superheated steam to impinge, without admixture of atmospheric air against the incandescent coals, substantially as and for the purposes specified.

And I also claim in the construction of fire chambers, combined substantially as herein described with a chamber or chambers for superheated steam, and with numerous apertures for the escape of superheated steam in jets to impinge against the incandescent coals, making the perforated wall of the fire chamber grooved, or the equivalent thereof, to reduce the thickness thereof at the perforations, substantially as and for the purposes specified.

1,988.—Furnace for Treating Ores by Superheated Steam.—The Hagan Manufacturing Company, New York City, and Wm. E. Hagan, Troy, N. Y., assignees by mesne assignments of Wm. E. Hagan. Patented March 8, 1864 :

I claim, First, The employment or application of superheated steam, in the manner as or substantially as herein described and set forth, for the purpose of refining or reducing metals, and for the removal of sulphur, arsenic, phosphorus, or other impurities from ores or minerals.

Second, The employment or application of superheated steam, as or substantially as herein described, for the purpose of calcining and disintegrating quartz rock, containing silver, gold or other metals.

Third, The employment or application of superheated steam for the refining of iron, and for the converting of iron into semi or pure steel, in the manner substantially as herein described and set forth.

DESIGNS.

2,079.—Coffin Handle.—Stephen D. Arnold, New Britain, Conn., assignor to P. and F. Corbin.

2,080.—Cook Stove.—James G. Clarke (assignor to S. H. Burton & Co.), Cincinnati, Ohio.

2.081.—Animal Trap.—Hubert C. Hart, Unionville, Conn.

2,082.—Bust of Abraham Lincoln.—Fisk Mills, Washington, D. C.

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can

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be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention; the Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention is susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their wholetime and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model, is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

G. P. S., of N. Y.—The mere use of a machine in a foreign country prior to the issue of a patent here to another party for the same invention, does not invalidate the patent. If the invention was patented in France, or described in any publication, it would invalidate a patent obtained here, unless the American inventor could prove prior invention.

D. H., of Mass.—The Patent-office Reports of 1862 and 1863 have not yet been issued.

C. C., of Mass.—We advise you to send us a drawing and description of your invention for our examination. A mere statement of what it is capable of doing does not convey a proper idea of its mechanical construction.

J. T. D., of Ill.—Your communication in relation to the weight of a barrel of flour is received, but your views do not seem to us sound. We have no doubt that the price adjusts itself precisely in accordance with the weight.

C. G., of Mass.—The practice of destroying caterpillars by saturating a rag with kerosene oil and burning their nests is quite common in many parts of the country. We have tried it successfully for two seasons.

J. B. L., of D. C.—Your countryman, Morin, has demonstrated that the idea of navigating the air by the plan of propelling balloons by muscular power, is preposterous. If the whole muscular force of a man could be exerted upon a balloon of sufficient size to sustain him in the air, it would divert it from the course of the wind only about four miles in an hour.

T. C. R. H., of R. I.—Fluids do not rise to the same level in tubes of unequal diameter connected with each other. In tubes under half an inch diameter a sensible difference is perceived in the hight of the fluid in the larger and the smaller—the latter being the higher. This is owing to capillary attraction.

A. M., of Wis.—Keep the coffee-pot bright; coffee cools quicker in a dull pot than in a bright one, for the reason that heat radiates more rapidly from a lusterless surface than from a brilliant one.

C. B. H., of Conn.—A piece of wrought iron one-fourth of an inch thick, twelve inches long and three inches wide, weighs two and a half pounds.

T. R., of Mass.—Bismuth melts at 476; tin, at 421; tin and bismuth, equal parts, melt at 283; tin 3, bismuth 5 and lead 2 melt at the boiling point. Advantage is taken of this to surprise children, by making tea-spoons of it, which melt when plunged into boiling liquid.

W. W., of N. H.—Pattern-makers' varnish—a pound of shellac to a gallon of varnish; ivory black enough to color.

A. A. S., of Pa.—The substance that you send us is principally clay. Emery is so hard that it can be quarried only by drilling the rocks on the sides of the emery seams.

D. H., of Mass.—Sulphate of copper is soluble in three parts of cold water, and is decomposed by iron filings, or by the galvanic battery.

Back Numbers and Volumes of the "Scientific American."

VOLUME IV., VII. AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

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The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

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TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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FOR SALE.—ENGINES, BOILERS, SHAFTING, Pulleys, Hangers, Rubber Machinery, and Machinery of all descriptions, at DAVIS'S MACHINERY YARD, Nos. 122 and 124 Hudson street, near the ferry, Jersey City. Factories of all descriptions bought and sold for cash. Castings furnished at 10 per cent less than New York prices, and delivered. 25 3*

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D. LAKE'S FLY-TRAP—ILLUSTRATED IN THE SCIENTIFIC AMERICAN of June 10, 1865. Sent by express on the receipt of $5. DAVID LAKE, Smith's Landing, N. J. 24 5*

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24 2 Scientific Booksellers and Publishers.

QUARTERMASTER GENERAL'S OFFICE, WASHINGTON, D. C., May 28, 1865.

NOTICE—SALE OF ARMY MULES.—MANY THOUSANDS OF MULES are being disposed of at Public Sale, at Washington.

The sales will continue until the number of animals is reduced in proportion to the reduction of the armies, now going on rapidly.

There are in the armies of the Potomac, of the Tennessee, and of Georgia, probably Four Thousand of the Finest Six-mule Teams in the World.

Many of them were bought in the beginning of the war, as young mules, accompanied the armies in all their marches and camps, and are thoroughly broken, hardened by exercise, gentle and familiar, from being so long surrounded by the soldiers.

The whole South is stripped of farming stock, and the North also has suffered from the drain of animals, taken to supply the armies.

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M. C. MEIGS, Quartermaster General,
24 Brevet Major-General.

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BODEMANN ON ASSAYING.—A TREATISE ON THE Assaying of Lead, Copper, Silver, Gold, Etc. From the German of Th. Bodemann and Bruno Kerl. Translated by W. A. Goodyear, of the Sheffield Scientific School, New Haven. 1 vol., plates, $2 50. This day published and for sale by JNO. WILEY & SON, No. 535 Broadway. 23 3

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Lime	1·10	Lime	1·1
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Yours, truly. (Signed)
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Fig. 1

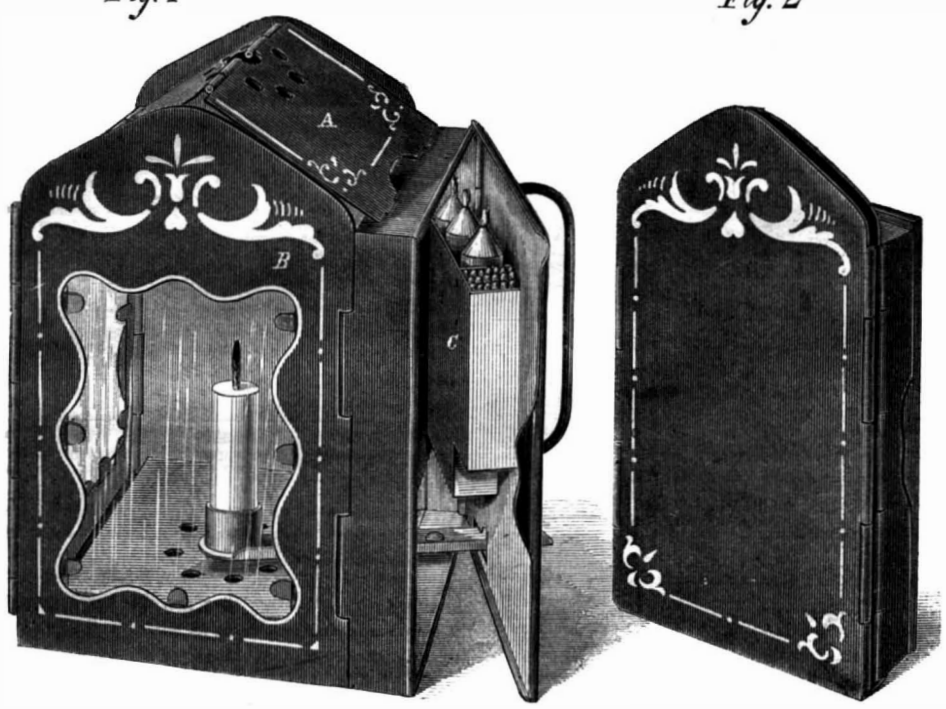


Fig. 2

MINOR'S POCKET LANTERN.

If Diogenes, seeking for his honest man had had one of these lanterns to light him he would have found what he sought.

This lantern is one of the most ingenious combinations of its class we have ever seen. When extended, or opened for use, it assumes the shape shown in Fig. 1, which is, as any one can see, a perfect lantern in every respect. When not required it is collapsed by folding first the roof, A, which has a hinge in the middle, and secordly, applying pressure across the corners of the case, B, which causes it to shut up flat; a second folding then brings it to the shape shown in Fig. 2, which is just half the size of the actual lantern. The candle will burn fully an hour, and a supply of them is provided in the magazine, C, which is on the door. Just inside the door there is a reflector, which cannot be shown. The candle holder, D, can be turned outside on a pivot so as to use this reflector when in a room; the light is much increased thereby. This is a capital lantern and it will be appreciated by every one.

It was patented through the Scientific American Patent Agency, by John A. Minor, on Jan. 24, 1865. Patents have also been secured abroad. For further information address the general Agent, New York Lamp Co., No. 259, Pearl street, New York.

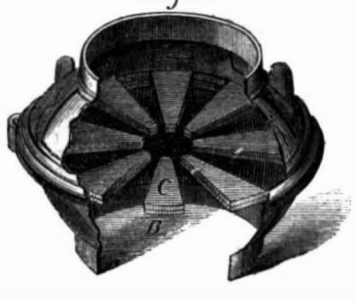
M. Houzeau has presented to the Academy of Sciences a memoir, "On the Influence of the Seasons on the Properties of Atmospheric Air." The author has exposed ozone papers at Rouen for several years, and has found that the chemical activity of the air reaches its maximum in the spring (May and June), diminishes in the summer, and in the autumn almost disappears. It re-appears, however, in winter, and becomes specially appreciable in March. The author remarks on the coincidence of this chemical exaltation with the awakening of nature, and suggests the study of it to physicians and farmers, who may, he thinks, make discoveries profitable to hygiene and agriculture.

Improved Damper and Ventilator.

These engravings represent a new damper and ventilator for stoves. By the use of it the shaft can be perfectly controlled or the apartment ventilated, as occasion requires. The invention consists in forming a casting, A, with a diaphaagm, B, in which are a series of openings. These openings are covered by plates, C, when the same are placed in the proper position. The exterior of the casting is ornamental in design, and is also furnished with holes, D, and there is a sleeve inside which covers them up when the projection, E, is moved. Both the plates, C, and the sleeve are connected together, but the apertures are so arranged with relation to each other that when one set is open the other set is shut, so that when the fire requires all the air which can pass through it, the openings, D, are closed, as in Fig. 2; otherwise, when the atmosphere is vitiated, by turning the damper so as to open the hole, D, it will be ventilated.

Fig. 1

Fig. 2



BOYNTON'S DAMPER AND VENTILATOR.

This damper and ventilator was patented through the Scientific American Patent Agency on May 5, 1863; for further information address Richardson, Boynton & Co., No. 234 Water street, New York.

It is said that a foreign photographic house now makes pocket handerchiefs with the photograph of the owner in the corner. In some cases this addition would not be an ornament.

Petroleum as a Steam Fuel.

In some experiments made by Mr. C. J. Richardson, an Woolwich Dockyard, with his improved petroleum boiler, he has succeeded in evaporating 150 gallons of water with 14 gallons of petroleum. It appears that with the improvements he evaporizes, on the average, at the rate of 12¾ lbs. of water per one gallon of petroleum, and Mr. Richardson anticipates reaching 14 lbs. or 15 lbs. with the gallon of petroleum. For such early trials, he considers the results hitherto obtained are extremely satisfactory. The oil is under perfect control, there is no danger whatever, and the boiler is very easily worked.

To Keep Butter in the Summer.—A simple mode of keeping butter in warm weather, where ice is not handy, is to invert a common flower-pot over the butter, with some water in the dish in which the butter is laid. The orifice at the bottom may be corked or not. The porousness of the earthenware will keep the butter cool.

[It will be still cooler if the crock be wrapped with a wet cloth. Not the porosity of the earthenware, but the rapid abstraction of heat by external evaporation causes the butter to become hard.—Eds.]

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STEAM AND MECHANICAL ENGINEERING

will continue to receive careful attention, and all experiments and practical results will be fully recorded.

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